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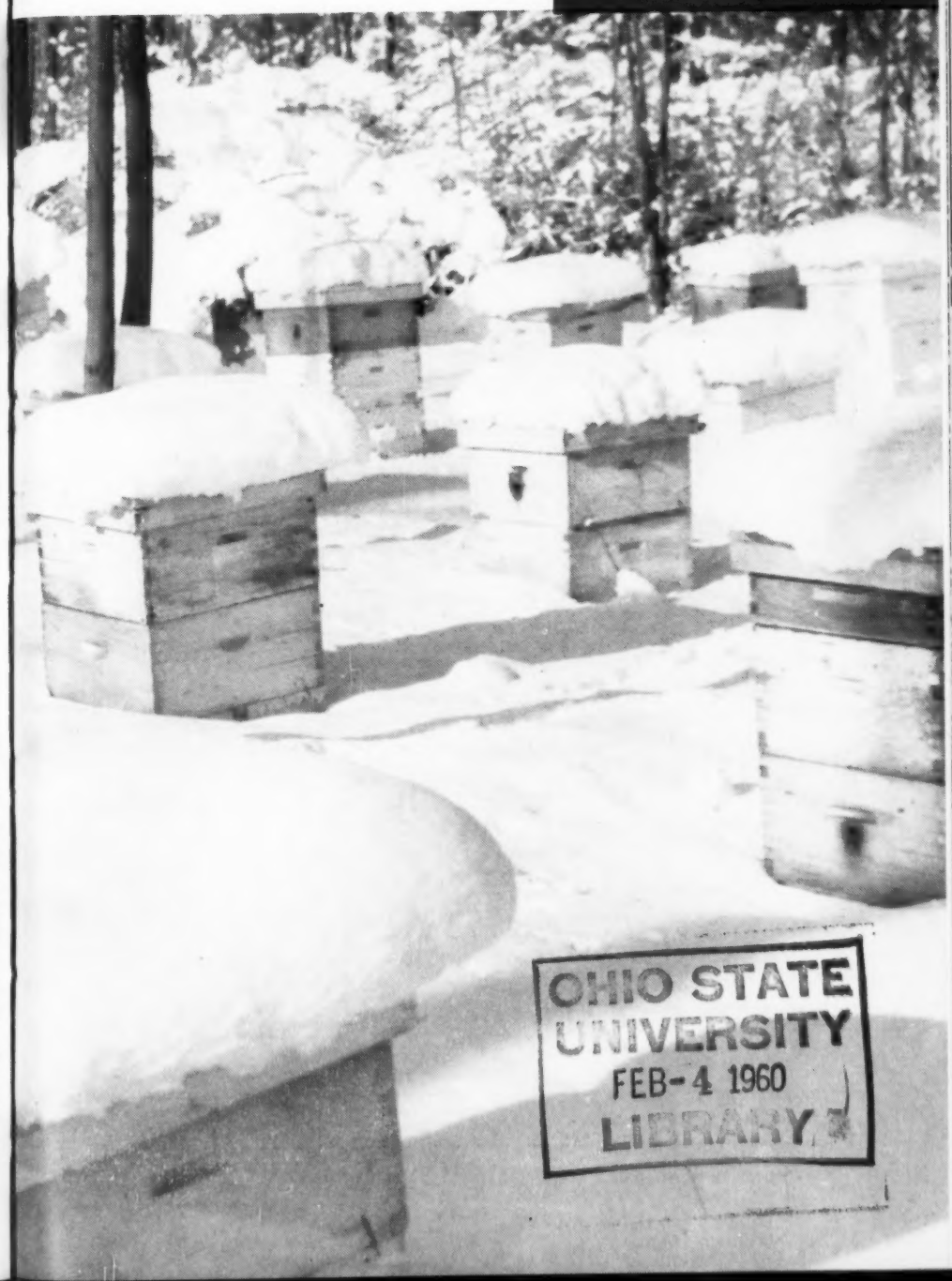
February 1960



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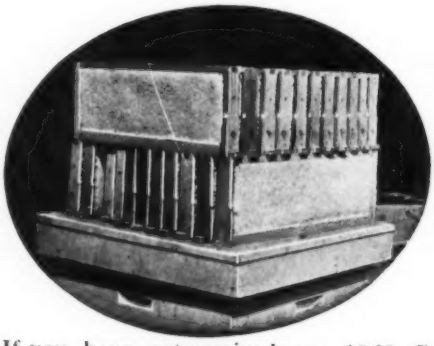

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Gleanings in Bee Culture

February, 1960 CONTENTS Vol. 88, No. 2

Monthly Honey Report	Walter Barth	69
Beekeeping Versus Pesticides	J. E. Eckert	73
Hobby Beekeeping in New York City	F. W. Gravely	78
Candy Manufacturer Uses Honey	A. B. Kennerly	81
Gambling with Sourwood	W. A. Stephen	82
Spring Fever	E. d. Fox	85
How I Started Keeping Bees	Henry S. Freeman	86
Nine Frame Spacer	Richard Taylor	89
The Difficult Swarm	Hill Reid	90
Conneaut Salesman Retires		92
Research Review	Dr. Roger A. Morse	93
News Reel		94
Editorials		96
Live and Learn	Propolis Pete	98
Let's Talk about Honey Plants	Dr. Harvey B. Lovell & Ethel W. Lovell	99
Two Queens in Hives	Australian Bee Journal	100
"Bee" My Valentine	Mrs. Benj. Nielsen	101
Bee Shippers' Labor Problems	E. C. Bessonet	102
Further Developments in Research on the Honeybee Egg	Dr. E. J. DuPraw	105
A Talk to Beekeepers	M. J. Deyell	112
News and Events		115
Asked and Answered		118

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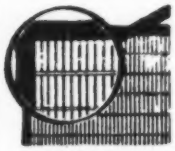

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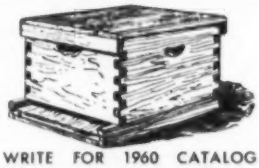

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Monthly HONEY Report

WALTER BARTH
Field Editor
San Antonio, Texas

NOT TOO long ago we mentioned the good honey promotional value of the book, FOLK MEDICINE by Dr. D. C. Jarvis. This book has been number one on the nation's non-fiction best seller list for months. Over 245,000 copies of this book have been sold. Beekeepers have written in to us about the definite increase in honey sales produced by this medical best seller.

Everything has been going well for FOLK MEDICINE until the appearance of the December 28, 1959 issue of TIME magazine. In their book review the Editors strongly pan the book. The only salvation for beekeepers is that the Editors have decided to attack the virtues of apple-cider more than honey. LIFE magazine at the same time devoted two pages to the book in a rather favorable manner. It will be interesting to see what effects these widely read reviews will have on the sale of Dr. Jarvis's book. . . .and honey.

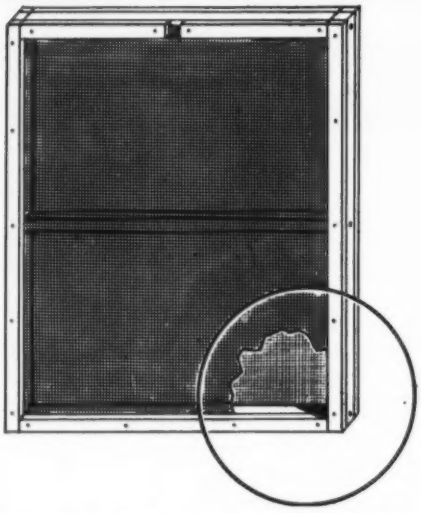
Speaking of honey, we are receiving reports of more and more price cutting at the retail level. Mr. Charles W. Park of Oakland, California sends us a retail card advertising "Desert Bloom" honey at 89¢ for a five pound can. Mr. Park points the blame at local beekeepers who give their honey away... an old refrain. Here in San Antonio we have recently had the appearance of retail discount houses entering the food field. They have been selling honey in their retail department at wholesale prices (for the small packages).

In spite of the price cutting in some areas reports from all over our nation indicate a brisk market. Bees are reported going into winter in good condition in most areas. The southeast and points in the west, such as Utah, seem to be an exception. In these areas bees are light and some feeding will be necessary next spring. In most areas more moisture would be welcome, and if the northern storms continue those areas won't be pressed for moisture.

On the marketing scene there seems to be a good public acceptance of plastic dispensers, particularly the newly introduced plastic honey bears. In some areas they have been short of sensational in boosting honey sales.

Comb honey is reported to be moving very well, and in most areas stocks are exhausted. L. A. Depew of Auburn, N. Y. says, "Dr. Jarvis's book has boosted sales of comb honey noticeably".

The beeswax market has been active at generally 42 and 44¢ with 200 pound freight allowances and a premium in trade. Higher prices are being reported but only when dealing in large lots of a ton or more. Most beeswax processors report normal supplies on hand.



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5 lb.	8.10	7.85	7.60

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		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

APRIL 1960

SUN	MON	TUE	WED	THU	FRI	SAT
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MAY 1960

SUN	MON	TUE	WED	THU	FRI	SAT
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29	30	31				

Estimated 500 million dollars will be spent on pesticides in 1965.—Photo courtesy USDA.

Beekeeping versus Pesticides

J. E. ECKERT
University of California, Davis

The insects are becoming more tolerant of the chemicals, even the most powerful, and continue to reproduce in greater numbers.

An efficient application of suitable sprays to an alfalfa field before bloom may increase not only the seed crop but nectar production as well.

IF PLANTS could talk, I believe they would cry out against the weight of chemicals that are being applied from the air, by land, within the soil, and even in the irrigation water, ostensibly to protect them from the ravages of insects. There are fungicides, weedicides, and herbicides in addition to the pesticides to make conditions more "suitable" for the growth of plants. Millions of acres of forests, marshes, pastures, waste lands, and cultivated crops are sprayed or dusted by state, Federal and private agencies as well as by the growers of cultivated crops, in this chemical warfare of man against insects.

And what is more, the insects are winning! One can count on the fingers of one hand the number of species of destructive insects that have been eradicated by chemical means. The insects are becoming more tolerant of the chemicals, even the most powerful, and continue to reproduce in greater numbers. Sure, a majority of them are held in check until the next application can be made, frequently at less than ten-day intervals. New pesticides are being made faster than the research and regulatory agencies can keep up with them. Biological control is being brought back into the picture again with greater emphasis and even bacterial spores are being manufactured **by the ton** to control certain types of insects.

It may be too pessimistic to state that the insects are winning in spite of control measures because improvements in cultivation, seed and harvesting—as well as in insect control—are creating so great a surplus of certain food crops that the cost of financing the storage of the surplus is fast becoming a national problem.

Millions are involved in the manufacture of the chemicals and more millions in their packaging, storage, sale and distribution. One estimate gives 260 million dollars as the amount that was spent in 1957: for pesticides including fungicides, 82 million dollars; herbicides, 35 million dollars; and pesticides, 94 million dollars. Rodenticides, repellents, soil fumigants, space fumigants and miticides made up the balance of 49 million dollars. It was estimated that over 500 million dollars would be spent for pesticides in 1965. Vast sums are being expended to "protect the public" from the toxic effects of the residues left on the food of man and animals and in the policing of the products after they reach market. It is said that a single chemical used as a pesticide may cost as much as one and one-half million dollars to manufacture,

test and put on the market.

Efforts are being made to prevent or to regulate the application of toxic substances that may be injurious to plants or to man but it is a colossal task and many interests are hurt by the failure of established controls. (The recent episode involving the cranberry industry is a good example. It may take years to determine the cumulative effect on man of either a single chemical or a combination of chemicals that are left in or on food products.)

The beekeeping industry looks small in proportion to the value of chemicals that are being used on plants to "protect" the farmer's investment in his crops and to provide a suitable healthy world in which to live. The value of bees to our agricultural economy is great and is considered in many instances in the processing, regulation and application of various chemicals. The beneficial insects, predators and parasites are being considered in some instances. But in spite of all that is being done to prevent the destruction of honeybees and other beneficial insects, the beekeeping industry is being hurt and hurt badly in many portions of the United States and throughout the world.

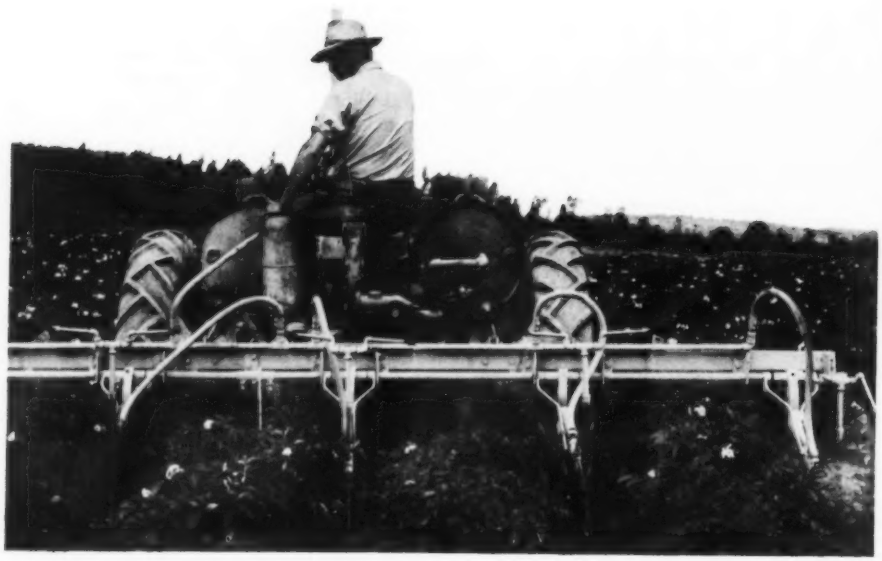
How Are Bees Affected?

Just how do the pesticides, herbicides, and fungicides affect the colony and what is the over-all effect on the general welfare of an industry that is considered to be one of the corner stones of agriculture?

In the arsenical age, before so many new chemicals came on the market, colonies were frequently killed outright, or were gradually weakened until they died during the winter or spring months. The bees were killed in the field when they took one-half part per million of an arsenical into the intestinal tract. Or, the pollen collectors gathered pollen contaminated with the arsenicals, carried it back to their hives and stored it in the comb for brood food. When this was consumed by the nurse bees, they died and the larvae died of malnutrition, some of poisoning. As long as the poisoned pollen was present, it constituted a threat of death for the colony. Sometimes sufficient fresh pollen was gathered to offset the effects of the poison and the colony lingered on, and either survived or died.

The same situation is in effect today, only other factors are compounding the toxic effects of pesticides. Many of the newer chemicals are nerve poisons and kill on contact; others act as fumigants when the bees come in close contact with them, and still others kill as stomach poisons. The nectar gatherers generally die in the field, which in effect is a good thing because it prevents the contamination of the honey in the hive. Many of the pollen collectors die from the effect of the contact poisons or the fumigants, so a smaller amount of poisons are being stored with the pollens than was the case with the arsenicals.

Nothing is more discouraging than for a beekeeper to find the field force missing and no flight of bees from his hives when they are surrounded by fields in bloom.



Beekeepers should learn the spray schedules that are used in his area.

The over-all effect on the colony is a greatly reduced population, frequently below the economic level, so the colony is of little value for pollination or for honey production. But the colony has to be cared for in labor and food, about the same as a cow that gives no milk, only the colony is smaller and receives less official notice. Many of our "poor seasons" or a "lack of a honey flow" are due to colonies becoming too weak to gather the nectar and pollen that is available. Most of the bees die in the field where they are not noticed. Some poisons that are applied to fields near the apiary sites cause bees to die at the entrance or in the hives when the same poisons applied at a greater distance are seemingly less injurious. The distance of a mile may or may not make a difference in the total number of bees that are killed, depending on how many of the bees are working in the fields treated. The treatment of a large acreage in the same general area, is more serious than when a small acreage is treated. Colony strength may be reduced by 50 to 75 per cent by one application and the honey flow may be over by the time the colony recovers.

A majority of the pesticides that are efficient killers of other insects will also kill bees. Some are less toxic than others so that the small kill of bees does not justify moving the colonies to prevent possible damage. If the same material is applied during the day, when most of the bees are working in the field, or at frequent intervals, the colony will become noticeably weakened. This applies to DDT and to toxaphene, considered to be "comparatively safe" poisons. Parathion, dieldrin, aldrin, BHC, chlordane, EPN, metacide, malathion, phosdrin, sevin, and some others **are highly toxic to bees and should not be used on blooming plants** when pollinators are working the fields. Some of these poisons have greater residual kill than others and so are more injurious to bees when applied and over a longer period of time.

There is No Remedy in Sight

There are no repellents that can be added economically that will prevent the bees from visiting the treated fields. It is highly improbable that any strain of bees can be developed that will be resistant to any of the various poisons, although some may be slightly more resistant than others. Laws against the application of poisons are only as good as the enforcement and it is almost impossible to secure sufficient evidence of the cause of loss of bees to secure any damages. **An educational policy sup-**

ported by an efficient administration of laws designed to protect the consumer or livestock seems to be the one that will give most lasting relief.

The beekeeping industry must continually work with other agricultural interests to (1) have the poisons applied efficiently and **only when needed;** (2) to confine the poisons to the fields treated and applied at a time before or after the blossoming of the crops, or when the bees are not working in the fields, or to give the beekeepers ample warning (72 hours at least) before the poisons are to be applied; (3) a system of compensating the beekeeper or farmer for damages caused by the application of poisons to large areas by county, state and Federal governments when such applications are to protect general welfare; (4) the use of the least toxic materials that will give crop protection.

On the brighter side is the increased interest in biological control, the use of parasites and predators and bacteria, radiation, crop rotation, sanitation and other methods to combat destructive insects without injuring the beneficial forms. Spores of **Bacillus thuringiensis** will kill many larvae of insects without causing any harm to man, domestic animals, and wild life.

It behooves every beekeeper to learn the spray schedules that are likely to be used in the areas in which his colonies are placed and, with the aid of his fellow beekeepers, farm advisors, and farmers, prove the value of bees to the general economy. The grower has the right to protect his crops from the depredations of insects and it will take the cooperation of all parties concerned to do so without injuring the economy of others.

It may be helpful if the manufacturers would concentrate on more specific pesticides than on general killers. The tightened controls designed to protect the health of man will cause the manufacturers to concentrate on chemicals that have a very short residual effect and to emphasize the need of applying chemicals only when needed and not as "insurance" against possible injury that may never develop.

Beekeepers should report each and every loss of bees due to pesticides to the county and state enforcing agencies, with substantiating information. Otherwise, the enforcing agencies will have little information on which to base evidence of injury from carelessness in the application of toxic substances.

A final remedial measure would be the revamping of recommendations as to the timing of applications to more nearly meet the blooming periods of the plants. For example, poisons should **never** be applied to corn during the morning hours when the bees are working for pollen but rather late in the afternoon or early evening. (Beekeeping cannot exist in areas where toxic substances are applied to corn in bloom if the bees are working the corn for pollen.)

Cities and counties have their own pest control programs.

Hobby Beekeeping

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In New York City

"Mr. Goldner's production has averaged 145 pounds per colony over the past six years, and this past year his per colony average was 180 pounds."

F. W. GRAVELY
New York, N. Y.

THE EXISTENCE of the hobby or sideline beekeeper here in the east, in the vicinity of the metropolitan area, is gradually becoming more precarious as the years roll by. As our city population moves outward and the country area becomes further removed from the center of our metropolis, the hobby beekeeper and his bees seem to be pushed along to make room for building projects.

Farmland Disappears

A good example of this trend can be found in Nassau County on Long Island, where the building projects have been enormous, and many hundreds of acres which were farm land some 10 or so years ago, are now solidly built up. As a result, beekeeping in Nassau County has gradually dwindled to about one-half what it was 10 years ago.

The Long Islander who is interested in bees, has not as yet thrown up his hands in defeat, as he is still very much in prominence in Suffolk County, which is his last stronghold on Long Island, and indications are that his fair county can boast now of an increase in bees and beekeeping, of some 50 per cent or so, over the past 10 years, just about making up the loss of Nassau County.

Where does the Long Island beekeeper go from here? Will he be pushed off of Long Island at Montauk, along with the fishermen? Not if H. D. Wells, County Agricultural Agent at Riverhead, can help it. Mr. Wells is a big asset to the Long Island beekeepers, and I dare say, probably has one of the best attendance records at their meetings. He is with them, not only at their Long Island meetings, but is along also on their trips to outlying areas, where they go from time to time in quest of more information on better management etc.

Up in Westchester County and suburban Connecticut we hobbyists are faced with about the same situation as prevails on Long Island, as we are gradually being pushed out in order to find satisfactory pasturage, or a place where bees may be kept without annoying the neighbors.

Partnership is Formed

My home is in White Plains, in Westchester County, and there is no room for bees where I live, but I am fortunate in that I have a Wall Street friend, Mr. R. P. Compton, who lives on Brookby Road in Scarsdale, and we have formed a kind of partnership in a little apiary, located on his property. Mr. Compton supplies the apiary site, the work shop and extracting house, and finances the purchase of equipment and we share in the management and work. The apiary is only about five miles from my home, which isn't a bad setup. Even though we are in a thickly populated area, our production is considerably above average.

Some of the Metropolitan and suburban bee enthusiasts are, however, not so fortunate as to have an apiary site so near, and many of them are locating their bees further up state, and in New Jersey and Connecticut away from the thicky populated areas.

There was a time when we looked on Hoboken, New Jersey, which is just across the Hudson from New York, as being in the Far West, but we no longer think of Hoboken as being so far away, for that metropolis, as well as many miles of the eastern portion of New Jersey, along the Hudson River

and the shore, now presents the same problem to the hobby beekeeper as the rest of us are faced with. Some of our metropolitan enthusiasts have joined the suburban New Jerseyites in moving westward in their fair state, to carry on, and, fortunately, the New Jersey beekeepers do not seem to resent our intrusion.

We have not, however, been completely eliminated from the metropolitan area, and the Bronx still boasts of an active beekeepers' association, and a good number of the members of this association still have bees in the Bronx, plus colonies that they operate elsewhere.

Disputed Land

One of the Bronx boys, Mr. Henry Goldner, is fortunate in that his property is adjacent to a considerable acreage which has been in litigation for a good number of years, and this has enabled his carrying on with his bees without being crowded out, and the disputed acreage has added to Mr. Goldner's pasturage, to where he is producing crops of honey, year after year, of which many of the commercial beekeepers would be proud to boast.

Now if any of you commercial beekeepers have had the patience to read this story, get set and lean back against something solid, for here comes information about Mr. Goldner's production, which has averaged 145 pounds per colony over the past six years, and this past year his per colony average was 180 pounds.

Richmond, or Staten Island, one of the Boroughs of Greater New York, also boasts an active beekeepers' association, and even though some of the members have their bees at their country places, in many cases, many miles away, there are quite a few of them who still have their apiaries on Staten Island.

Neighbors Sweetened

Where we keep bees in the metropolitan or suburban areas, we of course, try to keep the neighbors' dispositions sweetened by giving them a nice package of our product, and occasionally this results in the neighbor's enthusiasm being roused to the extent of also putting a bee hive in his back yard.

Some of this may give the impression that we are handicapped in our beekeeping efforts, and in a way we are, for it is not always convenient to make a trip of 50 to 100 miles or more, to work with the bees, but when we do we have that opportunity, we thoroughly enjoy that glorious feeling of being out in the open spaces again.

An attractive back lot apiary in the New York area that produces good crops of honey.

Candy Manufacturer Uses Honey

He searches for a honey that will give his candy an individual flavor.

A. B. KENNERLY
College Station, Texas

"I BELIEVE candy manufacturers would do well to search out new uses for honey in their confections," says George Judson of the Judson Candy Company, San Antonio, Texas. "We use honey chiefly in chocolate covered candies. The chocolate coatings protect against too rapid change in the composition of the honey."

Another reason why Judson likes to use honey in candies is to keep certain of them moist and chewy. Honey being hygroscopic, this characteristic of taking on moisture from the air helps to keep the candy from drying out.

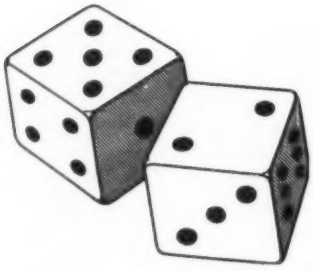
"We tried horsemint honey in our candies at one time, seeking a delicate flavor of mint in the candy," Judson revealed. "We were not successful, however. The flavor was too strong."

Judson uses the trial and error method to find a honey that will give his candy the individual flavor he desires. When he discovers a honey that gives the product a unique flavor, he needs then only to find a satisfactory source supply of that particular honey in the quantity he needs. Since varying climatic conditions affect the flows of honey from different sources, Judson believes it's a good idea for any manufacturer using honey to keep up to date on honey flows and honey sources.

The mild flavored honey from whitebrush of Southwest Texas gives the best flavors to his candies, Judson believes.

"While it costs a little more to use honey in candies," Judson observes, "it certainly does add a quality taste."

Gambling



W. A. STEPHEN
Extension Beekeeper
N. C. State College
Raleigh, N. C.

THE HONEY of Mount Hymettus in Greece is famed for its wonderful flavor and aroma, but to a native "Tar Heel" nothing can equal honey from the sourwood produced in his own North Carolina mountains.

The sourwood tree, **Oxydendrum arboreum**, yields only in the southern Appalachian ranges of the Laurentian Mountains on the east coast of the United States. Occasionally sourwood honey is obtained in the Piedmont or Coastal Plains, but its production has been so infrequent as to fail to stimulate an all-out effort for production. In the mountains, however, from West Virginia to Georgia, beekeepers and their customers leave other honey, which is mostly reddish or amber colored, for the bees and go for the light (if pure, almost water white) sourwood honey.

Sourwood tree with 60,000 blooms.

Coming, as it does, during late June and through July the bees, left to themselves, usually can build up fair populations for the sourwood flow. The fact that Nature cooperates in supplying nectar from early sources, however, does not mean that the sourwoods will yield, neither should it be taken for granted that failure of early sources will mean failure of the elusive sourwood. The latter condition, if sourwoods "hit", would go down in the beekeeper's book as a poor year because his bees were not ready.

Only the beekeeper who strives to get his bees built up by stimulative feeding of sugar syrup and pollen substitute can be sure of being ready. Even such efforts may not bear fruit as the following record shows.

On May 1, 1956 Mr. A. Mack living in sourwood territory on the eastern slope of the Blue Ridge Mountains bought an apiary of 15 colonies with equipment for 30 to 40 for $200.00. On May 19 seven of these colonies were requeened and divisions made of some that were preparing to swarm. A week later, 2 pounds of bees were added to each of the weaker colonies to bring them up to strength.

On July 7, sourwood honey was coming in and booster packages were added. The colonies were paired off as to strength and about 3 pounds of bees were added to one of each pair. Twen-

With Sourwood

He's gambling $819.14 on a crop of Sourwood honey.

ty days later, 275 pounds of honey were extracted, and the 21 colonies moved to a higher elevation to catch later bloom. The honey contained quite a lot of honeydew and was valued at $30.00. No further honey flow developed. The bees went into winter with only 20 to 30 pounds of honey on each colony. This was supplemented by a pail of sugar syrup.

In 1957 an early start was made to insure good colonies for the sourwood flow in late June or July. During the third week in February, the colonies, now 23 in number, were checked, one queenless colony given a queen and three nucs made to receive three new queens. In mid-April 12 four-frame nucs were made up from the best colonies and given new queens. Two over-wintered colonies were also requeened at this time. Of the 12 queens, eight were accepted, but later three of these were superseded.

Again booster packages were added, but this year only to strong colonies. Weaker colonies were used to care for surplus unsealed brood combs discarded from the colonies to be used for production. Fourteen of the strongest colonies were divided into pairs and to seven of these a total of 40 pounds of bees were added, varying from 4½ pounds to 6¾ pounds in order to even out the populations as much as possible. Colonies in more than one brood chamber were reduced to singles before adding shallow supers of foundation. The old, emerging brood was left, along with the bees. The youngest brood and eggs were stacked on weaker colonies. The net result was a grand total of 1½ shallow supers of honey of uncertain origin.

Colonies must be strong during Sourwood honey flow.

Out of 38 colonies going into winter, only 27 came through the winter of 1957-58. The bees had stored honeydew in the fall of 1957 and even by feeding sugar syrup and pollen substitute from January 1 and by continuous feeding at weekly intervals from February 23, it was possible to bring through only 23 colonies, some of these being in very weak condition. In order to make use of the equipment, 4 three-pound packages with hybrid queens were established on April 28. It was, of course, expected that it would be necessary to feed the packages heavily. As it turned out, some feeding was done, not only to these, but also to the established colonies every month during 1958. During the earlier months it was a case of subsistence and stimulative feeding. Later, just prior to the sourwood flow, the colonies singled out for production were given compensation feed sufficient to fill up the empty combs in the brood chamber.

Again nine equal strength pairs of colonies were set up and to one of each pair a 3 to 5 pound package of bees added. Net result—not one pound of surplus! Subsistence feeding began again on August 23 and a total of 700 pounds of sugar was fed to the 27 colonies going into winter in two different locations.

The spring of 1959, beginning the end of March, was excellent, there being little need for feeding pollen substitute or stimulative syrup. This was very fortunate because on March 27 most of the colonies averaged only 2 to 3 pounds of bees with 3 to 4 frames with brood in them. The stoutest colony had approximately 5 pounds of bees and 7 combs with brood. Thirty-nine combs full of brood and covered with young bees were used to help build up the populations during May. The accompanying picture, with the bees clustered at the entrance, shows that the colonies responded well and were in the peak of condition by mid-June. The double brood chambers were heavy, some tulip poplar honey having been stored in the supers and this was supplemented with honeydew. These supers, 23 in all, were removed in early July and fresh combs fitted with new foundation put on for sourwood.

Six of the colonies in the photograph (the even numbered ones) were moved to a more likely looking location on July 7. (Sourwood should have been yielding for at least two weeks and should now be at its height). Packages, averaging three pounds in weight were added to each of these six colonies.

Hopes for a crop of the elusive sourwood faded as the days went by. All indications had pointed to "This is the year", but it just didn't come. Fairly uniform night temperatures of about 60 degrees with daytime of about 85 degrees should have resulted in a good nectar flow. The weather had been favorable until mid-July when rains came almost daily, but this would not have prevented the bees from collecting nectar if the trees had been in production.

Mr. Mack is an above-average beekeeper. During four years he has spent $143.52 for queens and package bees. This does not include the booster packages added each year. These were surplus bees from the college apiary, our honey flow having terminated by mid-June. Altogether Mr. Mack has spent $819.48 for paint, equipment, supplies, sugar and pollen substitute and bees and queens since starting with his initial investment of $200.00. He has produced honey valued at $150.00 and has 27 excellent colonies mostly headed by queens under a year old, going into winter.

The source of sourwood honey.

Were Mr. Mack to add to his out-of-pocket expenses those incurred for operating, he could still come out on top next year. Sourwood sells, in his area, for 60¢ to $1.00 a pound. A 75 pound average production from his 27 colonies could gross him sufficient to pay for all his expenses, and would certainly compensate for some of his disappointments.

Mr. Mack is an optimist—more so perhaps than most beekeepers. He is a typical "next year" man and argues that, as a gamble, he must be getting nearer to winning.

When and if the sourwood "hits" he wants to be ready. To have a good honey flow and not have the bees to get it, would be more heart-breaking than what he has been through. With such an experience as his, do you wonder that sourwood, the renowned honey of the Appalachians, brings a premium price?

Spring Fever

E. d. FOX
Washington, D. C.

THERE ONCE was a time when I thought I could predict the coming of spring. A weather prophet I am not; it is just that my belief in signs is strong, signs like, "it's going to rain for sure, my corn is thumping".

On a day in early March our pussy willow tree burst forth in all its soft furry glory. "Aha!" I exclaimed to no one in particular, "This is it, the pussy willow tells the birds and flowers spring is here". The very same day it snowed. Pussy willow "goofed" and so did I.

We do keep our faith in the willow, however, in spite of this. In our back yard it is the first source of pollen for our bees. It is a pleasant sight to watch them working there. Dozens of buzzing, humming bees make a spring song we like to hear.

One cold December day I encountered a kindred soul as confused as I with the seasons. Mary, our neighbor was shoveling her way out of her back yard after a snowfall and called me to check a discovery she made in a flower bed on the south side of her house. There, under the snow was a lone honeybee, quite weak though still crawling on a dead petunia vine.

Do you believe in the pussy willow?

Mary and I agreed the bee must have left the hive on a warmish day and then became stranded when the snow fell. I took the unfortunate one home with me and placed it on our enclosed porch in the sunshine. Left a small amount of sugar and honey there and though I kept watch the bee did not eat and did not survive.

Spring really is the time of renewed hopes and plans. Even now friend husband is thumbing through the new bee supply catalog. I go about searching for paint, for the urge comes to begin my usual clean up campaign. Everything in sight must get a dab of fresh paint.

With spring on the way we look forward once again to days spent outdoors and our hopes are high for another good honey crop.

How I Started Keeping Bees

"I had been pretty brave up to this point, but looking at six packages, each filled with 12,000 to 15,000 bees and each critter armed with a potent stinger, made me wonder if I really wanted to be a keeper of the bees."

HENRY S. FREEMAN
Ft. Scott, Kansas

My daughter and I peeking into a hive.

IN NOVEMBER 1957 my wife, daughter and I were making our usual heavy inroads upon a new two-pound jar of honey we had just purchased at the local Super Market and my daughter made the remark, "Daddy, as well as this family likes honey, you should have your own bees".

Little else was said on the subject at the time, but I went to have a talk with a former neighbor of mine who had a few hives of bees at one time. I received a voluminous verbal report on keeping bees and after about an hour I had the fever. He gave me a copy of a book on bees to read. I had never read an encyclopedia before, but I started with the first page and although I ran into some terms and phrases that were "Greek" to me at the time, I kept reading. I stayed with that book reading it at every opportunity until my family began to wonder about my sanity. By the time I had read its more than 700 pages I had made up my mind —I was going to raise some bees!

I can remember as a small boy, my father had four or five colonies of bees, but I recall him producing only one-pound comb sections. At that age I only showed interest in consuming their product (I can remember the distinct aroma of those supers of comb honey) and as only boys will, we used to pester the bees coming and going out of the hives until we inevitably got stung.

My next step toward being a beekeeper was to order some hives and bees. I placed my order for five complete hives with three shallow supers for each hive, and five packages of bees to be shipped April 1st. As this was about the 1st of February I had plenty of time to assemble and paint my hives and supers, and install full sheets of foundation in all the frames.

I had read about observation hives,

so I tried my hand at making a two-frame hive. This called for a queen and more bees, so I ordered another package with queen to be shipped with the others. I thought that by having an observation hive mounted inside the house I could observe what the others were doing without having to open their hives too often. (It turned out that I received a very liberal education on bee behavior by watching this little handful of bees.)

The Packages of Bees Arrive

Because of the freezing weather in the South, the packages didn't arrive until April 22nd. Now that I had all those bees, what was I going to do with them? I had been pretty brave up to this point, but looking at six packages, each filled with 12,000 to 15,000 bees and each critter armed with a potent stinger, made me wonder if I really wanted to be a keeper of the bees! Then I thought of all the time and money I had already spent on this project. I read once more everything I had at hand on how to handle package bees and followed every step as closely as possible. I got them all in their new homes without getting a sting!

I had never read about any method of getting a bunch of bees into an observation hive though, so I started trying to figure out how to accomplish this feat without getting bees everywhere except into the hive. I took a four-inch tube with about a three-quarter inch hole and made a hole in the package screen, inserted the tube and connected the other end to the entrance hole in the observation hive. I opened the top of the hive and put the queen cage on the top frame. A few bees finally walked into the hive, looked around a few minutes and paraded back into the screened cage. This went on for several hours and the most I could count in the hive at one time was 15 or 20 bees. Things weren't going as I had planned! Being anxious to try my new smoker, I fired it up with some old rags at hand and baptized them with smoke. This finally worked to the extent that I got about a pound of bees in the hive so I closed the entrance and installed the hive in a window of the house with an entrance tube through the window to the outside.

Packages Installed Successfully

Now that my package bees were in their new homes, I mixed up some syrup and fed each hive through my Boardman feeders. I never realized bees could do away with so much food in so short a time. I wound up using 80 pounds of sugar for the five hives. By that time they were starting to raise brood, drawing out comb and bringing in some pollen.

After the third day I opened the hives to see if the queens were out yet. All but two were out so I poked a nail hole through the remaining candy in their cages and they were all out and laying within five days.

My 16-year-old daughter Sally and a new frame of brood.

The first time I opened the hives I was expecting the worst to happen. I knew I was on the right track though, when upon lifting the inner cover and taking out the center frame with bees hanging all over it, all were at work drawing out comb, working as though I were a mile away. Not a one of them lots its temper, all was serene, their work was cut out for them and they all seemed happy. I couldn't imagine them allowing me to invade their home without a fight. But—the book **said** there would be days like that!

What a thrill to see the first eggs

sticking in the bottom of the half-drawn cells! Then later to see the very small larva, which continued to grow until the cell was capped over. Here is where my observation hive proved its worth. I sat by the hour and watched the bees at work; visiting each larva every few minutes, some attending the queen, some acting as guards, some coming in laden with pollen and putting on a wag-tail dance, then hanging on the edge of a cell, sticking their hind legs inside the cell and kicking off the lumps of pollen. The poor queen has absolutely no privacy, but that doesn't bother her—she has only one job to do and that is to find clean cells and lay eggs. I've never seen her idle as long as she could find a clean cell to lay in.

About 12 days after the eggs were laid I began to notice the bees capping the brood. How could a bee know just the right time to cap a brood cell? I noticed that the new cappings followed the same pattern of the first eggs that were laid so I presume they knew the right time to perform this duty.

Then to see an unborn bee snip away at the capping to liberate itself makes you want to help her pry that little lid off her cell. It may not get quite enough capping off at first and will be able to only get its head through the hole, so back in it goes and nips some more off until it is able to extract itself from the cell. Just as soon as it is out of the cell it hangs on to the comb with one leg and cleans itself with all the other legs as though it were in a hurry to go somewhere.

The combs were pretty well filled out so I thought it time to add the first super.

I tried not to bother the hives too often, but I did open up the brood chamber several times during the first 30 days, mainly to see if everything was progressing according to what I had read. They had good weather from the start until about the first of July, during which time each colony stored approximately one full shallow super of white clover and alfalfa honey.

Three Colonies Swarmed

I made the mistake of going on a three-week vacation the first of June and, of course, lost some swarms. I cut out all the queen cells I could find and added plenty of supers before I left, thinking I would be back before they would be in the swarming notion. Upon my return the 22nd of June I looked into the hives and found three had swarmed, leaving a few bees and lots of brood. The other two had a lot of brood and a lot of bees. These two colonies made about double the surplus during the summer over the three hives that swarmed. This certainly proved the value of swarm control.

We had some very good flowers during July but we received a lot of rain which washed the nectar out of the blossoms and kept the bees in the hives. The fall flow of yellow blossom plants made a good yield, which allowed each colony to go into the winter with most of the brood chamber full of honey and a shallow super full.

Secured 400 Pounds Surplus Honey

I realized about 40 pounds of surplus honey from the five colonies. I believe I would have had double this amount if had controlled swarming and if we had not had so much rain during the summer.

I moved the bees close to the house for the winter and noticed that each colony weighed around 100 pounds with the lower body and food chamber, so they should have plenty of winter stores. I bored a three-quarter inch hole in the top of the food chamber and installed the small entrance cleat and faced the hives to the east. I am not packing the hives as no one in this territory does. From what I have read, they should go through the winter in good shape unless something unforeseen happens.

Early this coming spring I intend to feed them if they need additional stores, and try to get them started raising brood as soon as possible. I'm going to try to have colonies 80,000 to 90,000 bees strong and keep them from swarming if possible and see how much surplus they will produce.

I feel like I have been lucky so far inasmuch as I knew nothing about bees last year at this time. However, I do not believe I would have been able to do as well as I have without the advice of my former neighbor and our State Bee Inspector who lives nearby. I made several mistakes of minor nature but these should help in next year's production.

I undertook beekeeping as a hobby and I've never before undertaken anything as interesting as these little creatures. I've learned they are as docile as flies when handled properly and that they **can** become angry, but generally have a good reason for it.

My advice to someone looking for an interesting hobby that doesn't require too much spare time, is to get a couple of colonies and start in. To make it doubly interesting though, get an observation hive and install it in your home. I'll guarantee that your T-V viewing will suffer, for you will find yourself watching those bees at their various chores whenever possible, day or night. I'm afraid I'll be a beekeeper from now on!

The end of my first enjoyable year.

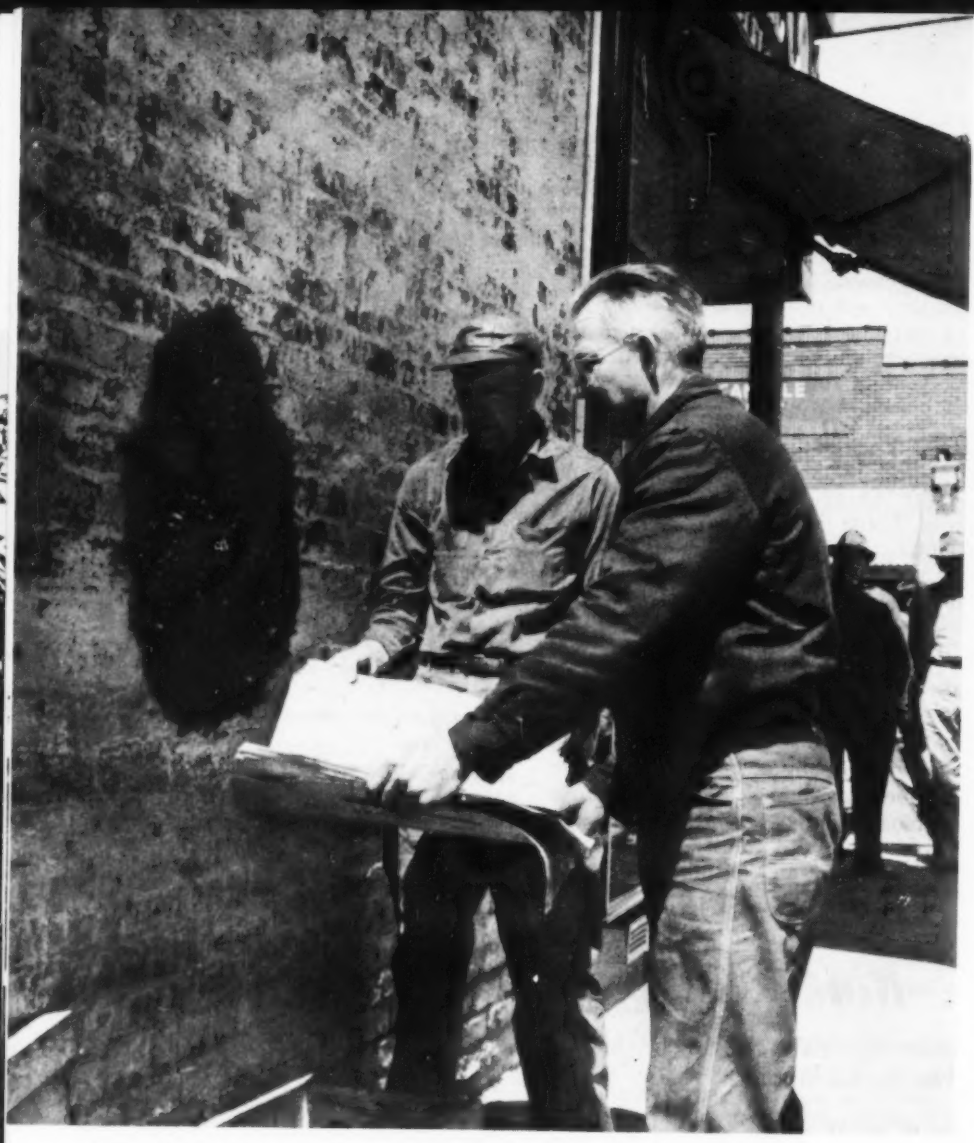
Nine Frame Spacer

RICHARD TAYLOR
West Barrington, R. I.

IT IS BEST to use only nine frames in extracting supers, to get thick, easily uncapped combs. Some beekeepers use all 10 frames if they contain only foundation, but I have used nine frames of foundation with good results, provided the frames are spaced properly.

It is time-consuming to space the frames by hand when supering, and the result is inaccurate. A frame spacer can be made in only a few minutes, and saves lots of time in the apiary.

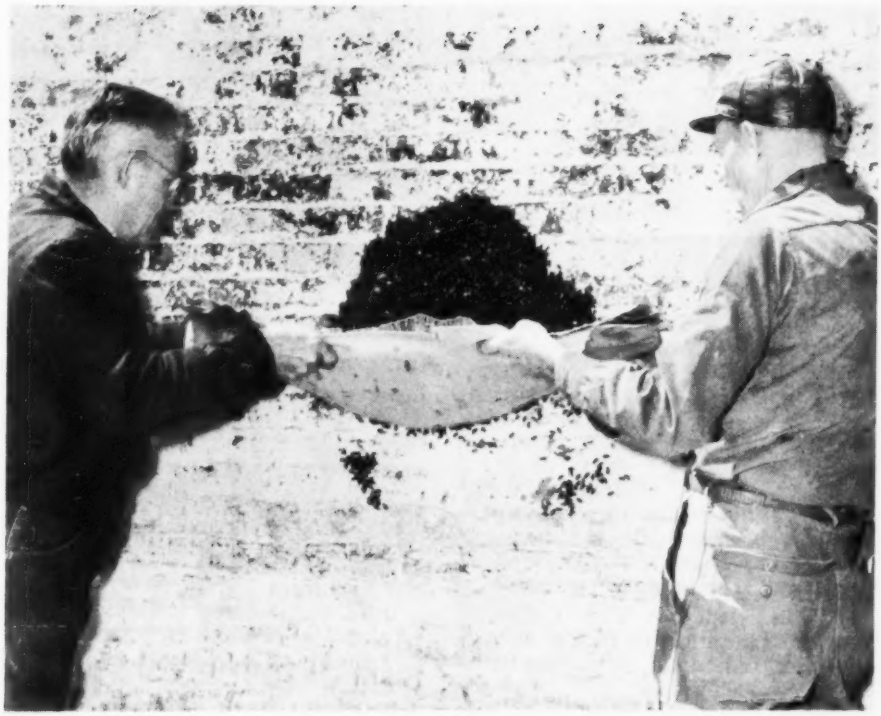
Cut ten pieces from a strip of wood exactly 7/16-inch thick, each piece about 2 inches long. Put a blunt point on each piece. Nail them between two strips of wood, leaving 1⅛-inch between each peg. One quick swipe with this and your nine frames are spaced perfectly.



Sheets of cardboard or a section of newspaper make a good bee scoop.

The Difficult Swarm

MR. HILL REID, a beekeeper of Greenville, Alabama, received a call from the Police Department to come downtown pronto to help remove a swarm that had clustered on a brick wall. The pictures show how the bees were scooped off the wall and put into a hive below. A swarm of bees filled with nectar are not likely to sting if handled carefully.



Slowly the edge of the cardboard scrapes the bees off of the wall and onto the cardboard as it is pulled upward.

The bees are shaken from the cardboard in front of the new hive. If the queen goes in the rest of the swarm will follow.

Conneaut Salesman Retires

AFTER 45 YEARS, W. R. Hubbard of the Conneaut Can Company, (known to the trade as Bill) is hanging up his traveling shoes, or perhaps better to say "traveling tires".

Possibly no Can Salesman, at the present time is personally acquainted with so many beekeeepers, dealers and jobbers of honey supplies. His territory extended over a good share of the United States. One lesson learned early in his experience was that you call on beekeepers whenever and wherever you can find them.

Bill's main regret at retiring is the severence of relationship with the Honey Industry. The Industry, as a whole, is a fine, likable group and has been most generous to him and to his company, The Conneaut Can Company, Conneaut, Ohio.

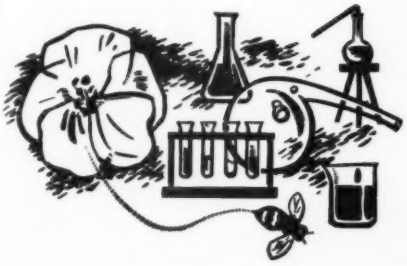
As yet, no successor has been appointed to take his place but orders for 60 pound cans will continue to be welcomed and given good attention by the main office at Conneaut.

Research in Honey

DR JOHN STOMFAY-STITZ, Professor of Biology at Duquesne University, Pittsburg, Pa., and his associates are engaged in a research project on honey. The first step is the study of the bacteriostatic effects of honey. Presently, they are handicapped because of a lack of honey samples from various parts of the United States. It is necessary that they receive 1 pound samples of pure, unheated honey in order to continue their project. They would very much appreciate receiving any samples available, preferably with the following data:

1. Year of the crop
2. Plant origin
3. Topical data, such as town, state, etc.
4. Race of bees, if possible
5. Soil conditions

Address all samples to: Dr. John Stomfay-Stitz, Department of Biology, Duquesne University, Pittsburgh 19, Pennsylvania.



Research Review

DR. ROGER A. MORSE
Research Editor of Gleanings and Ass't. Prof. of Apiculture
Cornell University, Ithaca, N. Y.

The Meeting of the Entomological Society of America at Detroit:

THE INTERNATIONAL Union for the Study of Social Insects, The Bee Research Association, and the Apiculture Subsection of the Entomological Society of America sponsored two symposia on the food gathering behavior of bees, ants, wasps, etc. Only a few of the papers given will be commented on below.

Dr. W. R. Lee of New Hampshire presented information on a new method of measuring competition and distribution of honeybees in a field. Colonies of honeybees which were marked with different genetic markers were placed on opposite ends of a field. By measuring the ratios of bees from the two colonies at various points between the colonies he was able to determine how bees distribute themselves in relationship to competition and floral sources.

Dr. E. O. Wilson of Harvard reported on ants, including the recruitment of workers to food sources. Ants make odor trails when food is found and other worker ants are recruited until the food source is saturated, at which time less trail substance is deposited, thus inhibiting the further recruitment of workers.

Dr. G. A. Hobbs of Lethbridge, Alberta, Canada, reported on studies with bumblebees. Some of his work concerns the varying tongue length of bees and the flowers which they will work. Variation in tongue length of the various species does occur and dictates to a certain extent the crops which the bees will visit.

Summaries of papers will be mimeographed and distributed to members of the three organizations listed above. In addition to the papers above, two business meetings of the Bee Research Association were held and special attention was given to methods of raising funds to support Bee World and the Apicultural Abstracts which are issued by the Bee Research Association.

Dr. R. A. Morse was elected chairman and Dr. T. S. K. Johansson of Queens College, Flushing, N. Y. was elected secretary of the Apiculture Subsection of the Entomological Society. The meeting next year will be held in Atlantic City, New Jersey.

A Note on Queen Importation:

NEWSLETTER number one of the Texas Beekeepers' Association dated December, 1959, carries a note that a queen honeybee with escorts was shipped from the Yucatan Peninsula in Mexico to a beekeeper in Texas. The queen came through the Port of New Orleans and it was officially cleared at that port. It is surprising that border officials are not more aware of quarantine law.

The beekeeper concerned was evidently unaware of the importation law and the dangers associated with bringing unknown stock and perhaps unknown diseases into this country. When the beekeeper learned of the dangers involved he was very cooperative and

(Continued on page 124)

NEWS

Dr. Wilhelm Schoel, German Agriculture Secretary, visits Superior Honey Plant at Los Angeles. Left to right: Roland Stone, Edmund Blaine, U. S. Agriculture Marketing Specialist, Dr. and Mrs. Schoel and Wendell Shore.

Texas children study bees. This second grade reading class at Navasota Grade School finds the small observation hive helpful in learning about bees.—Photo by Jim Davis.

REEL

"Daddy, please buy me a bear." Both children and adults are falling in love with the new plastic containers for honey.

MIAMI, FLA.—Left to right: Russell A. Martin, Gainesville, Florida Plant Board Chief Apiary Inspector; Felix H. Uzzell, Sebring honey producer and president of Florida State Beekeepers' Assoc.; Fred L. Steely of Homestead, vice president of FSBA and chairman of the Miami arrangements committee, take time out from convention planning to look over a brochure of some greater Miami attractions available to sightseeing delegates attending the Beekeepers' Association meeting here next October. — Miami-Metro News Bureau Photo.

Editorials

Beekeeping Conditions Generally

ON REVIEWING Honey Marketing News Semi-Monthly Report, as of January 6, 1960 issue by U. S. Department of Agriculture, it is noted that favorable weather conditions for bees prevail over most of our country. Some areas of the North have a snow coverage which is favorable for good wintering. Rainfall has been ample, except along the Pacific coast, especially in California which has suffered from drouth this past season. This caused a very short honey crop in that state.

It is encouraging to note that in most of the states, honey is moving quite well, with prices remaining firm. In a few areas the market is practically bare and it would not be surprising if the demand would exceed the supply, before this year's crop is harvested. This would apply mainly to the clover region where the crop will not be removed until five or six months from now—during July and August.

Cyanogas Dangerous to Handle

WE RECEIVE REPORTS occasionally of beekeepers being killed as a result of careless handling of Cyanogas when used to destroy the bee moth. This is a very dangerous and deadly chemical and should be used with extreme care. Never use it in an enclosed building or room, unless whoever uses it is ready to run out of the room just as soon as the gas is applied. Even when Cyanogas is used out-of-doors in treating supers of combs for bee moth, the operator should stand on the windward side of the hives to avoid inhaling the fumes of the gas.

Some years ago we had occasion to destroy a few diseased colonies of bees and applied the Cyanogas by placing about a tablespoonful on a stiff cardboard paper in front of the hive, then pushing the paper into the hive. We placed a glass inner cover on the hive in order to see the behavior of the bees when the Cyanogas was applied. In less than half a minute all of the bees in the hive appeared to be dead.

As already stated Cyanogas is dangerous to handle so be extremely careful next time you have occasion to use it.

Large Clusters of Bees Essential for Successful Wintering

DURING RECENT YEARS this requirement has been stressed. Unfortunately some beekeepers do not realize its importance. It should be said that it may be possible, with expert management, to winter colonies that are not up to par in strength. In the far north it is rather difficult to do this. If such colonies do go through the winter they are usually rather weak in the spring and have to be strengthened, either by adding combless packages or combs of emerging brood from other colonies. This procedure involves some expense.

When the temperature within the hive of bees reaches 57°F. the bees start to form a cluster and as the temperature becomes colder, the cluster draws together more tightly. The bees in the center of the cluster generate heat by muscular activity while the bees on the outer portion of the cluster act as insulators by crowding their bodies closer together, with their heads pointing to the middle of the cluster. These bees on the outside are sometimes referred to as the shell or periphery of the cluster. They do retain a considerable portion of the heat generated by the bees in the center of the cluster.

There is, however, a significant fact, perhaps not recognized by the majority of beekeeepers, namely, that a large sphere or cluster has a relatively smaller surface than a small cluster. The late Dr. E. F. Phillips, in Farmers' Bulletin 695 entitled "Outdoor Wintering of Bees", states it clearly when he says, "Since the surface of a spherical cluster is proportionate to the square of the diameter, where the volume is proportionate to the cube of the diameter, it follows that a large colony cluster has a relatively smaller surface for the radiation of heat than does a small one".

Populous colonies of bees going into winter quarters with an adequate amount of food and protection from the elements are likely to winter successfully, whereas weaker colonies may not live through the winter, especially if the weather is severe. If such colonies do live until spring they may be a liability rather than an asset.

Importance of Upper Winter Hive Entrances

IT USED TO BE thought that colonies of bees during the cold winter months needed only one comparatively small bottom entrance. It is now the general consensus among experienced beekeepers over the country that an upper entrance as well as a small lower entrance is essential for successful wintering.

A number of years ago when we wintered colonies in single story brood chambers we tried an experiment consisting of closing the bottom or main entrance entirely on about 25 hives and boring a ¾-inch auger hole about the middle of the front of the hive, just below the handhold. The bees wintered quite well.

During recent years we have practiced wintering colonies in two story or food chamber hives, restricting the bottom entrance to about 4" x ⅜" and boring a ⅝" auger hole in the upper hive near the handhold. This method of wintering has worked out quite well for us. The upper entrance or flight hole permits bees to take a flight, when necessary, during the cold months. This flight hole is comparatively near the winter cluster and the bees can use it for a flight easier than they could use the lower entrance, which might possibly become clogged with dead bees or ice.

Some beekeepers object to boring holes in their upper supers, and perhaps rightly so. Of course, these holes can be plugged up with corks during the summer months.

We have found that it is possible to provide an upper entrance by cutting a notch about one inch wide in the front of the rim of the inner cover. This inner cover can be turned upside down which brings the upper entrance to the top of the hive. It is necessary to push the outer telescope cover forward as far as it will go in order to permit the bees to fly out and in this upper entrance. It may be said that the rim of the outer cover prevents the cold air from blowing directly into the upper entrance.

Beekeeping authorities are now of the opinion that it is excess moisture within the hive and not cold that hurts bees during the winter.

We are of the opinion however, that some protection for hives of bees in cold regions, is advantageous, especially in the far north where bees may not get periodic winter flights. Even with some protection for the hives such as black building paper, it seems to be an advantage to provide some type of an upper entrance to give bees an opportunity for flight during a mild spell of weather, also to make it possible for the bees to expel excess moisture that may accumulate within the hives during cold winter weather.

Live and Learn

PROPOLIS PETE

WINTER IS a time for reflection. I generally do my reflecting these dark and dreary days while I am scraping frames and supers, or doing those little repair jobs that you don't have time to do in the spring or summer. Some beekeepers go South, but, believe it or not, I like winters. This is a summer resort town, and it is such a relief to know everybody that you see, and to be able to sit and gab in the general store, that I can't see going down to a repetition of what we have here in July and August. My New England ancestors would propably say that I am a bit "tetched"

One of the reasons why I like it here in the winter, is a throwback to the old days, that is a big comfort to me. About 100 years ago, the owner of this land that is now mine gave up the idea of trying to farm this particular spot. The soil was so poor that nothing worth while would grow on it. It wasn't even good pasture land, although he would keep his cows here when he wanted them close to the barn.

There was an old trotting race track across the creek, and the old man got the idea that he could make a fast buck for himself out of this worthless land from the sports who frequented the track. So he planted a couple thousand jack pines, built himself a bowling alley, and put some boats in the water to rent to fishermen. The boat renting was a dud, but the bowling alley was a success. Eventually the race race track failed, and the land reverted to agriculture. A curious thing is that while the land on this side of the creek is worthless for farming, the land across the creek is very fertile. One of those whims of nature. After the race track failed, the bowling alley lost its popularity too. But about this time city people began to come out on the train, or on the daily steamer from the big city, to spend the summer on the water. The bowling alley was sawed in half and made into two summer bungalows. There is no record of when this was done, but soon after I bought the land on which one of those bungalows stood (in 1938), I tore out the old home made ice box, and it was insulated with newspapers dated 1902.

There were several reasons why I bought this place. One was that it adjoined our summer home, another was that my bee business was growing and I needed some place for storage and a honey house, and a third was that the owner begged me to buy it. I got it for a song, and brother, you should hear me sing. I set up a belly stove in the old kitchen and converted it to a workshop, and there is where I spend a lot of my time when it is too cold and wet to do anything outside. I clean supers and frames, melt down cull combs, do any repairing that is necessary, and store supplies and jars in other parts of the building.

In one of the rooms I have a setup that is the envy of a lot of people. I have some old decrepit porch rockers, a broken down bed spring on four legs, a couple of book cases with books on bees and other things, including every copy of Gleanings and American Bee Journal since 1935. I have a bottle gas heater in that room and do a lot of meditating there when I am not busy in the workshop. Since I do some of my meditating with my eyes closed, there are people who accuse me of lying down on the job, but that is mostly jealousy on their part.

Many beekeepers will accuse me of treason when they read this, but I often meditate, for instance, why should we bemoan the fact that the world doesn't beat a path to our doorstep to buy our honey at a good price? I think of Ol' Ben Franklin's wise saying—"The Lord helps those who help themselves". And another saying that I have pasted to the wall of this den of mine that is much to the point. I will quote it, and hope that the editor doesn't censor it. It has a bad word in it. Not so bad that it isn't in the Bible in half a dozen or more places, but general usage calls it a swear word. "Everything cometh to him who waiteth, if he works like hell while he waiteth".

Black Cherry (Prunus Serotina).

Let's Talk About HONEY PLANTS

DR. HARVEY B. LOVELL and ETHEL W. LOVELL
University of Louisville, Louisville, Ky.

THERE ARE MANY species of wild cherry which bloom in the United States every spring. Most of them have white flowers in rather dense clusters and secrete nectar in fair amounts. When conditions are favorable they are worked for nectar by honeybees.

Wild black cherry (**Prunus serotina**) is one of the more common species and blooms in May. It grows into a fairly large tree, producing a number of small black sour cherries which are eaten by birds.

Another common species is the

chokecherry (**Prunus virginiana**), which usually forms dense stands of small bushes.

A third species common in the eastern United States is the fire cherry or pin cherry (**Prunus pennsylvanica**). It springs up in waste land after a fire. R. E. Newell wrote (**Gleanings** May 24, 1951) that pin, black, and chokecherries are important for buildup, as the waste land of Massachusetts is covered with bloom.

Cherry honey is not usually considered very desirable. In the South the honey is described as dark red and bitter with the flavor of a cherry pit. A little will spoil the flavor of the first orange honey.

Mississippi. W. E. Plant, Hattiesburg, wrote that wild cherry blooms from March 12 to March 22.

Montana. Harry Rodenberg, Jr. told me that at Wolf Point, chokecherry blooms from May 25 to June 5 but gives only a couple days of flow in the latter part of May. The honey is white to light amber with a good flavor.

Iowa. Frank Pellett (**ABJ** July 1926, pp. 236-237) wrote that he had received a sample of wild cherry honey from W. S. Pangburn of Jones County having a distinct cherry taste and a bright yellow color.

Idaho. Charles Hancock of Jerome says that chokecherry blooms May 10 to May 20 and is a dependable source of nectar in some locations when the plants are abundant.

Maine. Fred Perkins of Albion told me that cherry blooms from May 1 to May 10 producing a honey which is dark red with a heavy body but mild flavor. His largest yield is 60 pounds, but it fails so often that he cannot depend on it.

Colorado. Joseph Moffett, Colorado A. and M. College wrote me that cherry trees are important in May as spring buildup.

Eckert and Allinger (1939) reported a sample of wild cherry honey to be light amber with a Pfund reading of 66. They found the sucrose content to be rather high, 2.56 per cent.

It is surprising to find so many different opinions as to color and flavor of cherry honey but this is probably due to the fact that cherries so often bloom at the same time as many other plants and the honeys get mixed.

North Carolina. P. F. Campbell of Canton describes his method of getting pure sourwood honey. He had trouble for many years getting unsealed honey which would turn sour. He writes "I conceived the idea of leaving on the old supers of mostly sealed honey from basswood and only taking out three or four frames in the center and inserting that many frames of full sheets of foundation. This did the trick. The bees all had to work on the empty frames and therefore instead of scattering the honey all over a whole super they finished up these frames beautifully. I also kept a close watch over them and if I found completed frames and the flow was still on I would just remove the frame and give another empty. I only have six colonies but I got approximately 60 pounds of excellent sourwood honey this year, when none of my neighbors received any. I am telling them all how to get some sourwood honey.

Two Queens In Hives

Taken from the August 1959 issue of THE AUSTRALIAN BEE JOURNAL

LAST AUTUMN, we required a little royal jelly and as conditions were not very good, considered the easiest way to get it was to render some hives queenless. Therefore, we divided five hives into approximate halves and were surprised to later discover that all the old hives were queen-right.

The previous spring, we divided 50 hives that were about to swarm and were surprised to find two days later, that 57 of the total 100 had queens laying.

These occurrences make us wonder how many hives have two queens. Once we did find two queens in a hive but the odds are against this as we are unable under our system of management to use time for queen searching.

It appears likely that many hives, in our apiaries, have two queens. Perhaps it is common generally. It could be due to our local conditions or management. Anyhow, the accepted belief that a hive has only one queen no longer holds water with us. At the moment, we're wondering.

Serve Valentine "sandwiches" with piping hot honey-sweetened coffee or chocolate.—By Kellogg Co.

"Bee" My Valentine

MRS. BENJ. NIELSEN
Aurora, Nebraska

IF YOU HAVE been thinking about doing something a bit special for Valentine's day how about letting honey give Dan Cupid an assist? Perhaps a "coffee" or a smart looking gift package filled with heart shaped choice honey cookies, or similarly shaped bits of your favorite honey nut breads singly or pressed together with smooth cheese spread slightly moistened and blended with mild flavored honey.

For that coffee, a red tablecloth (a dyed sheet will do) centered with a low arrangement of red and white carnations makes a striking setting for gleaming silver and honey Valentine goodies. Serve piping hot, honey-sweetened coffee or hot chocolate.

And for those gift packages you might choose a heart shaped cake pan to hold honey goodies. Or fill a pretty dish to be wrapped in red cellophane with white curlicue ribbon, or any number of the attractive Valentine wrappings so tantalizingly displayed to tempt gift-giving folks.

Have fun! And be ready with the recipes.

(Continued on page 123)

Have you ever wondered why it is necessary to send in your order for package bees and queens well in advance?

E. C. BESSONET
Donaldsonville, La.

THE MAJORITY of bee shippers will probably agree that labor is a very serious problem. There are several factors contributing to our troubles and the two main factors are the seasonal nature of our operations and the competition of other industries in the labor market. Bee shippers can keep labor quite busy during the entire year, but so much of the time is spent during a period in which nothing is sold to help the bank account. This means, of course, having men to do work that is not necessary, to keep them on the payroll. If this policy is not adopted, especially with skilled help, the shipper will find himself in trouble the following spring when he has to start stocking nucs and producing queens. Men are needed to manage the outyards to assure an ample supply of bees for packages. According to my observations, a definite number of skilled men are a "must" if the shipping schedule is to be maintained and emphasis placed on quality. It is here where confusion and trouble arise if the shipper is unprepared to start the shipping season without a sufficient number of skilled men.

Labor Market Competition

In our immediate area, we have the greatest industrial development of any area in the U.S.A. and the demand for good men has removed from the market practically all men who are skilled and reliable. We do not look for skilled men, but do look for reliable men willing to work and they have proved most difficult and almost impossible to find. Fortunately in our business, we are three partners who are skilled in all phases of beekeeping and in our other business, so we do not need many extra men to conduct our businesses. However, we find that most shippers also have another sideline to supplement their income and to use their labor forces more effectively to provide year-around work. There are few shippers now without some other line of activity due to the declinig demand for package bees and in some instances queens also.

It may be necessary for a shipper to accept part time work in the event that he has no other income otherwise the returns from his spring package season and the few summer queens he is able to sell fails to assure a decent living standard.

Wages in competitive industries could not possibly be paid by any ship-

Bee Shippers' Labor Problems

"According to my observations, a definite number of skilled men are a 'must' if the shipping schedule is to be maintained and emphasis placed on quality."

per, so the shipper must employ help that is not reliable at a price he can afford to pay. No doubt in areas where few industries exist and only farming is conducted, labor is more plentiful and the quality perhaps better. In our area fairly good help receives about twice as much as ordinary farm labor and that is some incentive. However, such labor must be fairly efficient, otherwise they are unprofitable.

Fall and Winter Activities

It is the consensus of opinion in the North that the shippers in the South have little to do during the fall and winter months and I want to assure you that such is not the case. Unlike the North, we do not pack our bees in the early fall and forget about them until spring. In the South, the bees are active during parts of every month in the year and need considerable attention. It is true that we do not have to work them as often, but we have wax moths that are active during this period and any queenless hive is taken over and the combs destroyed. There are the Argentina ants that are very destructive and cattle to upset the hives, so yards must be inspected not less than every three weeks to check for trouble that might arise.

The shipping cages have to be made and believe it or not this is quite a project in so far as time and expenses are concerned. The shipper can tell you how efficient help is needed to cut up the material and nail up the cages and if such help is not available poor help will increase the cost to the point where the cages will be too expensive. Under the best possible conditions the shipper has to release some help and look for replacements early the following year to start production operations.

There is always more work than a shipper can usually afford to do, as the equipment here deteriorates fast and must be replaced at a great expense. Queen nucs are also difficult to keep in good condition and repairs are slow and expensive. The replacement of hive bodies, frames and foundation combine to increase the shippers' operating costs. No wonder so many are forced to discontinue bee and queen production each year, as conditions are such that the buyers are unable to pay more and the shippers are unable to continue to produce at prices prevailing during the past few years. It is a situation that demands planning to use time to the best advantage and to keep in mind that the income from only bees and queens in a high priced labor market is impossible without other sources of income.

When a shipper has either to do outside work, or operate another business, he has to be sure that there is no conflict between the other activities and the production of bees and queens, otherwise one or both will suffer. In our two businesses, we have a dull period in one when the other is active, thus we can shift our forces very effectively, but we do not permit either to be neglected.

(Continued on page 124)

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Research on the Honeybee Egg

"The process of hatching is a highly interesting event, which has not been described very often in English and then frequently with serious errors. I have observed this process frequently and in eggs of very diverse origin, I will take this opportunity to give a detailed, factual account."

DR. E. J. DuPRAW
Univ. of Florida, Dep't. of Biology
Biologische Sta., Lunz am See, Austria

THE HONEYBEE'S egg is a tiny mass of fluid and semi-solid gel, considerably smaller than the head of a pin, and molded in the approximate shape of a sausage. In exact size, the eggs vary strikingly when compared under the microscope; Schnetter (1934) found the average lengths of eggs from three different queens to vary almost 14 per cent of the minimum, the averages being 1.81, 1.71 and 1.59 mm. However, I have observed two eggs, known to have been laid by the same queen within 90 minutes of one another (and probably laid almost successively), in which the larger was between ⅓ and ½ again as large as the smaller; both eggs hatched normally and almost simultaneously.

Ignoring variations in size, it is also not uncommon to observe that the length and breadth proportions of the eggs vary surprisingly, so that one notices "tall, thin" eggs and "short, fat" ones from the same queen. The general shape, however, is always the same, with the sausage a little bent, very much like a real sausage, and the diameter of the egg toward one end noticeably less than toward the other end. This shape of the egg makes it very easy to tell one end from the other, as well as the in-curved or concave side from the out-curved or convex side. Ordinarily, it is even easier to orient the egg, since in the process of laying, the smaller end always emerges first and adheres to the bottom of the comb by means of a gummy material. The egg thus stands on one end, and this is **always the same end.**

This question of orientation is important, since it is well known that the various parts of the developing bee (i.e.

the larva) always appear at the same position in the egg. For instance, the head of the larva always appears at the larger, unattached end of the egg, while the tail appears at the smaller, attached end. Furthermore, the belly of the larva develops at the convex or outcurved side of the egg, while the back appears at the concave, in-curved side. With respect to the developing larva, then, the egg standing erect greatly resembles a soldier at attention—chest out, head back, spine curved, the hind parts of the body curving down gracefully to the attachment on the ground.

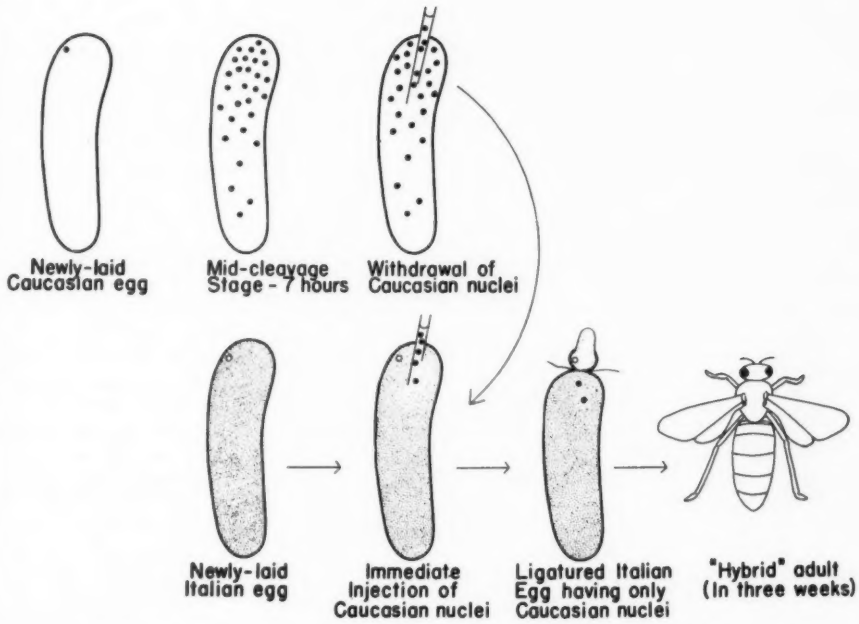
In examining the young honeybee egg, however, no hint of the future larva can be found. The living egg, itself, under the microscope appears almost structureless, and scarcely any change can be detected during the first 24 hours. If a small tear is made in its surface under the microscope, the egg contents flow out easily, appearing as a white liquid not much less fluid than water. By killing and staining the egg, it can be seen that the greater part consists of spheres or globules of yolk, and that surrounding all this yolk, very much like the rind of a watermelon, is a thin layer or cortex of plasm. In the plasm near the unattached head end of the egg, and toward the convex or belly side, lies a tiny spherical nucleus which contains either 32 chromosomes (in the case of the worker) or 16 (in the case of the drone). Finally, surrounding the entire egg, like a cellophane wrapper, is a thin, flexible, and transparent membrane called the chorion; this chorion presumably is not a living part of the egg, and takes no active part in development.

The fact that such a tiny drop of jelly, containing so very little of visible structure as the newly laid honeybee egg, can give rise spontaneously to the many and intricate structures of the larva, and eventually to those of the adult bee, is one of the outstanding marvels and most difficult problems of biology. It is all the more remarkable if one considers that the egg develops, not simply into a bee, but into an Italian bee, or an Egyptian, or Indian, or Caucasian bee, and that this bee may then produce more eggs according to its kind. To be sure, parts of this process of development are well known. The purely visible events, for instance, were described and drawn in great detail by Nelson in 1915, and his book, "Embryology of the Honeybee", is still a standard reference on the subject. It is also well-know that the nucleus, with its 16 or 32 chromosomes, is intimately involved in all the processes of development, accounting for much of the differences among different races of bees; the inheritance of the chromosomes from one generation to the next has been subjected to a most thorough analysis in the science of genetics. Finally, concerning the plasma of the egg cortex, studies with other insects as well as with honeybees, indicate that this plasma also has a controlling influence in development, and that factors which determine the appearance of given organs in given positions are elaborately organized in this part of the egg.

Nevertheless, many of the really basic questions concerning the development of the egg still remain to be answered. For instance, it is not yet known exactly what functions the nucleus and chromosomes perform during development and afterwards. With respect to the cortical plasma, also, the exact nature and organization of the active elements is still largely a matter of guesswork. And finally, most difficult problem of all, the details of the relationship between nucleus and plasma, their inter-action and cooperation in determining the characters of the young bee, remain almost entirely to be discovered. In this connection, a new technique has recently been developed, using the eggs of the honeybee, which promises to be most useful in revealing many of these features of development; details of the technique will be described farther on.

Development of Egg

The first 12 hours of development by the honeybee egg are marked primarily by repeated reproduction of the nucleus. This occurs by a complex division process, giving first two, then four, eight, 16, and on to several thousand nuclei. As the nuclei multiply, some migrate from the head end of the egg toward the tail end, moving through the central yolky core of the egg. Eventually these nuclei migrate out of the yolky area into the cortical plasm, so that at about 12 hours they form a uniform layer scattered under the sur-


Newly-laid Caucasian egg
Mid-cleavage Stage - 7 hours
Withdrawal of Caucasian nuclei
Newly-laid Italian egg
Immediate Injection of Caucasian nuclei
Ligatured Italian Egg having only Caucasian nuclei
"Hybrid" adult (In three weeks)

SCHEME ILLUSTRATING TRANSPLANTATION OF HONEYBEE NUCLEI

face of the egg in the plasm. At this stage, cell membranes form, giving a tissue, coating the egg under the chorion "wrapper" and known as the "blastoderm". Externally, very little change is visible in the living egg during this time. In some eggs it is possible, by strong transmitted light, to make out the position of the single nucleus in the earlier stages, and even to distinguish two and four nuclei stages. In later stages, when the nuclei approach the surface, they are easily seen by direct light under the microscope as tiny white specks on the egg surface. Before formation of the blastoderm it is very difficult to stain the nuclei or cleavage cells differentially, Schnetter's thionin technique being the best whole mount procedure; at about 11 hours, however, a striking change takes place and the plasm surrounding the nuclei stains intensively with methylene blue or Giemsa in fresh smears; the nuclei themselves, in contrast, stain much more lightly.

Between 12 and 24 hours a series of very subtle changes take place in the number, arrangement, and constitution of the blastoderm cells, of which essentially nothing is visible externally and very little internally. However, it is during this time that the positions of the various future larval structures are finally determined. This was demonstated by Schnetter in 1934, in one of two long papers on the egg of the honeybee, both so thorough and absolutely trustworthy that they must form the groundwork of all future research with honeybees' eggs. Oddly enough, I have found Schnetter's papers almost unknown among bee researchers in both Europe and America (including the library of the Bee Research Association).

Schnetter demonstrated that, at 12 hours, the egg of the honeybee may be tied across with a hair loop, excluding as much as 21 per cent of the egg length at the head end, and that behind this pinching off (or ligature) a perfectly complete though smaller, normal larva would still develop. At 24 hours, a ligature in the same place would, in effect, cut the future larva in two, so that only a partial larva would appear behind the loop. From this it follows that the positions of the parts of the future larva are fairly definitely determined in the egg sometime between 12 and 24 hours.

In similar ligature experiments which

I have undertaken, using easier, more efficient loops made from single strands of cotton, I have observed normal development and hatching in eggs ligatured as early as seven hours and 25 per cent of the egg length from the anterior end. In more complex experiments involving penetration of the egg and manipulation of the nuclei, I have observed normal development and hatching of embryos ligatured as early as 2½ hours. Since Schnetter also reports normal development of an egg ligatured at 18 hours and the 17 per cent level, it may be recorded that, for simple ligatures, there is a period from seven to 18 hours after laying, when as much as 17 per cent of the egg may be eliminated at the head end, without interfering with development.

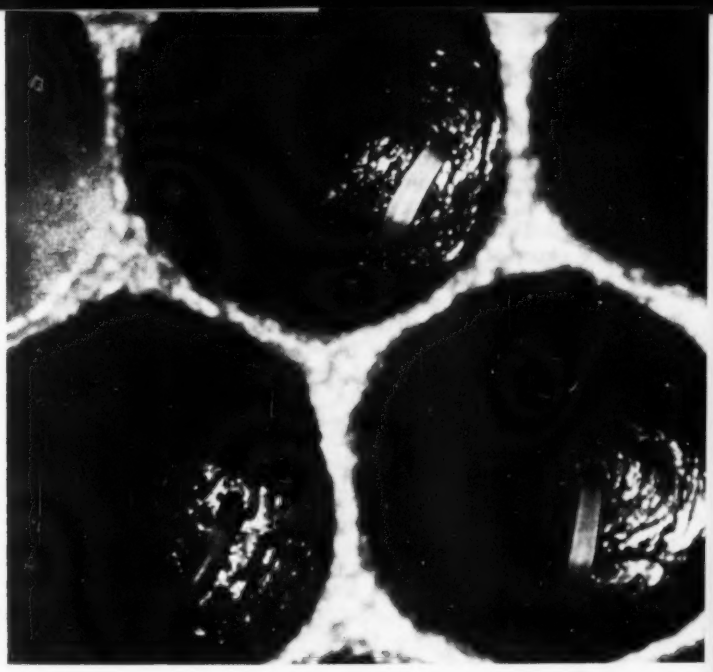
Between 24 and 30 hours the first unmistakable sign of normal development becomes visible externally in the living egg. This is the appearance of a gradually enlarging, clear transparent area at the head end of the egg, between the whitish embryo and the cellophane-like chorion. The appearance of this clear space is due to a marked and very peculiar shortening of the developing larva inside its chorion. The shortening continues until at about 40-48 hours another transparent area appears at the tail end of the egg. Eventually, the embryo itself occupies only about ¾ the space inside the chorion, the remainder consisting of a clear, water-like fluid. After the point of maximum shortening, the embryo begins to grow at the expense of the clear areas, until by hatching, the larva almost fills the chorion once more.

At about 40-44 hours an event takes place, lasting a matter of hours, which is very conspicuous externally. This is the "zipping up" of two membranes which grow down from either side and meet along the middle of the larva's belly. The curved free edges grow closer and closer together, forming an hour-glass pattern on the surface of the egg, finally touching at the neck of the hour glass, and then, zipper fashion, extend the area of juncture toward the head and tail. Some hours after this event, or in other words, well on into the third day of development, the form of the larva, showing head and segments, first becomes apparent within the egg. After this point, the larva grows somewhat longer, and in a few hours more, hatching takes place.

Just as the size and proportions of the egg are subject to considerable variation, it appears that the length of development until hatching may differ by a matter of hours, even under identical temperature conditions, and purely as a function of the eggs themselves. I have not had the opportunity to compare eggs of different queens, side by side; however, in dealing regularly with eggs timed to within half an hour of laying, maintaining these eggs under conditons in which those laid within the same hour hatch within the same hour, and using always the standard temperature of 35½ °C., I have had the experience of finding some queens whose eggs invariably hatch in 84 hours (a **very** inconvenient period) and others whose eggs hatch "by the book" in precisely 72 hours (both types from American "Italian" bees). In the absence of perfectly controlled, side by side comparisons, no more can be said than that these differences certainly appear to be inherent in the eggs themselves.

Position of the Egg Varies

It's a common belief among beekeepers, and one which turns up distressingly often in publications, that the age of honeybee eggs in the comb can be told by their positions—that the newly laid egg stands erect, that it leans more and more at an angle as development proceeds, and that finally on the third day it comes to rest on its side at the bottom of the cell, an event followed by hatching. Although it appears to be true that eggs do quite often shift position during development, it is certainly very far from true that this occurs as a rule, or that it is at all useful in indicating the stage of development. In the first place, the egg is frequently not laid in a perfectly erect posture, so that within an hour of laying, many eggs show a considerable tilt; in the second place, many eggs never do tilt at all, a fact which I have confirmed in work with American "Italian" eggs, pure Cyprian eggs, and pure Carniolan eggs, both in the comb and in the incubator. Indeed, the process of hatching takes place in perfectly erect eggs with such efficiency, and I have so regularly observed development and hatching in eggs that



"It's a common belief among beekeepers that the age of honeybee eggs in comb can be told by their positions."

did not tend in the least to lie down that until recently, I believed the entire story was a myth. However, I have now had the opportunity to compare notes on this matter with Herr Fyg, of the Bee Division, Milk Research Institute near Bern, Switzerland, and with Dr. Ruttner, of the Bee Breeding Division, Austrian Federal Institute for Apiculture; with the personal assurances of these careful observers, I am now convinced that circumstances do exist when large numbers of eggs in the comb may undergo a simultaneous tilting. I do not believe, however, that the eggs ever come to lie fully prone before hatching has taken place.

The phenomenon is a peculiar one, since according to Herr Fyg, the tilting is not related to gravity (a possible influence, inasmuch as the eggs stand out horizontally in the comb), but takes place in random directions; further, it is certainly apparent that the egg's only external contact is through the chorion with its gummy adhesive, neither of these taking any active part in development. The most likely explanation would seem to be some sort of shrinking, either by the chorion or by its adhesive material. However, it may be at least definitely stated that the mechanism responsible for tilting the eggs, whatever it is, frequently does not operate at all, that when it does operate, it has no very exact relationship to stages of development, and that the conditions under which it appears (perhaps connected with racial origins) are still entirely unknown. Though the question is intriguing, it holds very little promise of either practical or theoretical value, and may remain a mystery for sometime to come. It is to be hoped, however, that future authors of beekeeping manuals will no longer report that the age of honeybee eggs may be guessed from their position.

There is still another common belief among beekeepers, this one with absolutely no basis in fact. That is, that the eggs cannot or will not hatch until adult bees have deposited brood food in the cells or otherwise assisted in the hatching process. As a matter of routine, I have maintained literally hundreds of eggs in the incubator for the entire three days of development, and have observed these eggs to hatch, invariably and completely, without any contact with adult bees, brood food, or any other external assistance. The technique is extremely simple, and may easily be repeated by anyone with access to a microscope, incubator and the desire to observe the development and hatching of the honeybee egg. The eggs are removed from the comb by cutting out a small circle around the

base of the egg and lifting this out as a "platform" for the egg (in other words, the egg itself must not be touched). These tiny platforms, with the eggs in the centers, are then placed in an ordinary Petri dish containing a basal layer of beeswax; a strip of moist cotton is added and the dish incubated at 35½°C. Under these conditions nearly every egg will hatch simultaneously with controls kept in the hive.

The Actual Hatching Process

The process of hatching is a highly interesting event, which has not been described very often in English and then frequently with serious errors. Since, as stated previously, I have observed this process frequently and in eggs of very diverse origin, I will take this opportunity to give a detailed, factual account.

As stated before, only very subtle changes in the external appearance of the egg are detectable during the three day period of development. Consequently, the egg at the end of this time is still a white, sausage shaped object, balanced on one end—if not standing perfectly erect, at least in contact with the ground only at the tail. On careful examination, the form of the larva may be detected inside, with head, segments, and tracheae visible; however, the outermost chorion is still quite unchanged and presents a smooth profile.

Typically, the first sign of hatching is a gentle, weaving motion, caused by muscular contractions on the part of the larva, but visible as a motion of the whole uppermost half of the egg; the tail end, of course, remains a fixed point of attachment, while the rest of the egg shows gentle, rhythmic oscillations resembling the motion of a whip. Usually quite early in these movements a very conspicuous drop of liquid appears on the surface of the chorion, its position being ordinarily about halfway the length of the egg. Although I have never actually seen a tear or opening appear in the chorion, it is apparent that this liquid emerges from within the egg through the first tiny rent caused by the motion of the larva. The droplet sometimes remains rounded and conspicuous for a period of minutes, sometimes disperses very soon over the surface of the egg, "wetting" the chorion. At about the same time, the chorion loses its smooth profile and takes on the segmental profile of the larva. Involved here is essentially a slight collapsing of the chorion onto the surface of the larva, due to the escape of the small protective layer of fluid within the egg.

Larva Stands on its Tail!

The picture now presented to the investigator is a most ridiculous one; it is the picture of a honeybee larva, standing up sturdily on its tail, and making solemn deep bows to the world at large!

The larva continues to bow, sometimes pausing for a time, and the bows become considerably deeper, until at last the larva's "forehead" touches the surface at a greater or lesser distance from the tail attachment. Usually the larva pauses for a time in this position, only head and tail touching the ground, the rest of the body forming an arch, for all the world like a tiny croquet wicket. At this point, there is ordinarily no trace of the chorion on the midparts of the larva's thorax and abdomen; evidently, it is dissolved, either by the fluid first released from the egg, or by another secretion from the larva. However, at the tail and also on the head, remnants of the chorion remain for a time. As might be expected, a great deal of variation is possible in the details and timing of these events, with the larva pausing sometimes for half an hour or more; sometimes, too, the larva forms only a very shallow arch, bending over lengthwise "from the ankles", so to speak, and lying almost prone. However, I believe it is a fairly general rule that the head touches the ground first.

Soon after the croquet wicket stage, the larva eases itself over onto one or the other side, and the final details in the hatching process are completed after the larva has assumed its typical C-shaped position. The chorion remnants adhering to head and tail gradually disappear, undoubtedly also dissolved, so that all parts of the larva are free and open to view; finally, the larva begins its rhythmic, peristalsis-like movements, forcing air to circulate through the spiracles of the side lying uppermost. The opening and closing of the spiracles is clearly visible under the microscope, leaving no doubt that the chorion is truly gone.

These points should perhaps be emphasized once more:

1. All the above events occur routinely in the absence of adult nurse bees, brood food, or any other special external aids.
2. No trace of the chorion ever remains after hatching; it is not a case of the chorion rupturing and the larva crawling out, but of the membrane being gradually dissolved.
3. As a very general rule, the egg begins to hatch in at least a partially upright position. Although occasionally it happens that an egg falls onto its side before hatching, I have never known such an egg to hatch from its prone position; so generally true is this, that I suspect a perfectly prone position very likely interferes with the normal weaving motions and rupturing of the chorion necessary for hatching. At least it is certain that hatching fails whenever any great part of the chorion surface comes in contact with a fluid such as water or brood food. Such foreign fluids seem to interfere with the dissolving of the chorion, and one sees the larva struggling actively, but ineffectually, inside the egg.
4. In several particulars, the description which I give here is contradictory to statements by others, for instance, by Smith (1959), who seems to agree with the authors he cites (Lineburg, Robbins, Bertholf) that brood food is necessary for the completion of hatching, and who describes the egg as being drawn over to a prone position by capillary attraction of the fluid droplet on its surface. Nevertheless, what I have described, I have observed many times over, and the same process may certainly be observed by anyone interested enough to remove and incubate the eggs according to the simple techniques given.

One last, very recent development will be described, which promises to reveal a great deal about the causes guiding development in the honeybee egg, as well as in the eggs of other animals. Using the egg of the honeybee, it has been possible, for the first time, to enter and change the internal structure of a living egg, leaving the egg essentially undamaged. This new method for instance, has allowed material to be injected into the egg (which is smaller than the head of a pin), without interfering with the development and hatching of a normal larva.

An Astounding Experiment

The key to this remarkable operation is the series of ligature experiments, described before, which were first performed by Schnetter in 1934; as Schnetter discovered, the honeybee egg is able to lose 20 per cent or more of the material at the upper or head end, without interfering with its development into a normal (though smaller) larva. Beginning with this fact, I have now been able to insert glass pipettes into honeybee eggs at the head end, inject materials into the egg, and afterwards "heal" the egg by tying off the same end, giving an unbroken egg surface. Such eggs go on to hatch as normal larvae.

This work, which is still in progress, has its most interesting application in exchanging nuclei—that is, replacing the nucleus of one egg with a nucleus from the egg of an entirely different race. In this way artificial combinations can be made which are not practical in ordinary breeding. It is possible, for instance, to place a pure Carniolan nucleus in an egg whose cortical plasma and other elements are of purely Cyprian origin. In this way, something may be learned of the function and interaction of nucleus and cortical plasma during the remarkable development of the egg. Such results may have importance of a very broad scope, with significance for medicine and general theoretical biology.

Indebtedness is expressed to the American Philosophical Society and the National Institutes of Health for financial support, and to Mr. Haynie, Extension Apiculturist of the University of Florida, Dr. Murphey, of the Department of Entomology, University of Florida, and Dr. Ruttner, Biologische Station, Lunz am See, Austria for their generous cooperation.

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A Talk To

M. J. DEYELL

IN LAST MONTH'S talk we discussed "Why Keep Bees and Where They Should Be Kept". In this talk it seems appropriate to say something about the inmates of the hive, also the hive.

Inmates of the Hive

Even though honeybees have lived on this planet for many thousands of years and we now know something about their habits, we are learning new things about them each year. For example, we now know that bees have a means of communication, a sign language. When some of the bees in a hive discover a fresh source of nectar and pollen they transmit this information to other bees in the hive by means of a dance they perform on the comb, a round dance, also a wagtail dance. There is a book entitled, "The Dancing Bee", by Prof. Karl von Frisch which is now available.

As previously stated, in order to handle bees successfully we must know something about the members of the bee family and how they behave.

The following may seem rather elementary but for the benefit of new beekeepers and those planning to start beekeeping, it should be said that a normal colony of bees consists of a queen bee, some drones and worker bees.

The Queen

The queen is a female, the mother of the bee family. Her sole function is to lay eggs in the cells of the combs which the worker bees construct. The queen may lay between 1,500 and 2,000 eggs each day during the height of the season. Normally there is but one queen in a colony. A queen may live two to four years and during her lifetime may be the mother of one-half million bees. The queen lays two kinds of eggs, fertile and unfertile. The fertile eggs produce worker bees and the unfertile eggs produce drones.

The Workers

Worker bees are females—undeveloped queens. The life of a worker bee in the northern states where the winters are cold may be five or six months, extending over the less active season of the year—late fall, winter, and early spring. However, a worker bee born during the spring months lives about six or seven weeks. Her wings become frayed and she eventually falls down at the hive entrance or inside of the hive and dies. Twenty-one days are required from the laying of the egg until a young worker bee emerges from the cell.

During a good honey flow worker bees make about 10 or 12 trips a day to the fields to gather nectar. How do we know this? Someone sat at the entrance of a hive early in the morning when the bees were starting out to work, and put a drop of white paint on a worker bee's back, then watched her fly out and in the hive during the day. This bee could be easily seen among the thousands of bees entering and leaving the hive.

Beekeepers

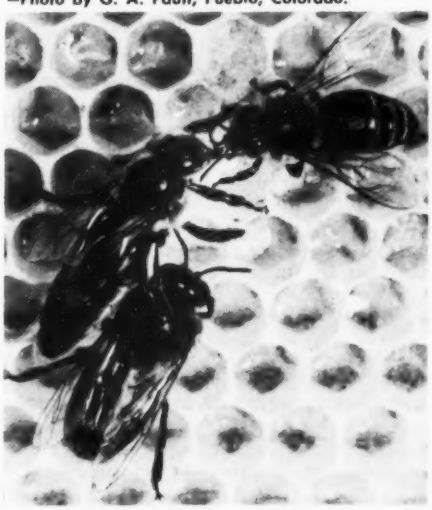
Starting with package bees is by far the simplest and most profitable method of starting an apiary.

The worker bees actually perform the work or labor in the hive, as their name indicates. They feed the young larvae, take the loads of nectar from the field bees and store it in the cells of the comb, build waxen cells and cap the cells over after they are filled and the honey is ripened. They also guard the entrance of the hive against enemies of bees.

The Drone

The drone, which is a male bee, has no father, but he has a grandfather on his mother's side. As stated previously, a drone is developed from an unfertile egg. The drone's sole purpose in life is to fertilize the queen. The drone is not permitted to live over winter and in the late fall he is pushed out of the hive to die.

Close up of a queen (upper left) receiving food from a worker bee (upper right). One of the legs of the queen is lying on a drone or male bee. —Photo by G. A. Pauli, Pueblo, Colorado.



Importance of a Good Hive

One of the natural habitats of the honeybee is a hollow tree. Before the modern hive was invented swarms of bees coming from bee trees were captured and put into straw skeps or box hives. Such hives did not permit an examination of the combs.

In parts of the South, swarms were put into log gums that became hollow as a result of the centers rotting away. The hollow log gums were sawed into lengths about two feet long. These were placed on planks, with an entrance cut out of the lower portion of the log. Boards or planks were placed on top to serve as covers. Holes were bored in the cover of the log gum and an empty metal container or crock was inverted over the holes. During a good honey flow the bees would store surplus honey in the metal receptacles or crocks placed on top of the hives.

The Invention of the Movable Frame Hive

L. L. Langstroth, sometimes called the father of American beekeeping, invented the movable frame hive in 1851. Mr. Langstroth visited Medina a number of times and told A. I. Root and later E. R. Root the story of his invention. Langstroth had been concentrating

on the idea of making a movable frame hive. One night after retiring, the idea of the movable frame hive came to him so he got up, went down to his workshop and made a frame and hive somewhat similar to the standard hives we have today. This movable frame hive makes it possible for beekeepers to remove and examine combs in a hive without crushing or killing the bees. This invention ushered in a new era in beekeeping and since that time our industry has advanced by leaps and bounds.

The Importance of Correct Bee Spacing

Some beekeepers who try to make hives apparently are not well informed concerning the necessity of correct bee spacing. We heard of a man in a nearby city, a cabinet maker, who decided to make his own hives. When he put bees into them he discovered that the tops of the brood frames were flush with the hive covers and when he placed the covers on the hives occupied with bees, he killed a great many bees on the tops of the frames because there was no bee space. He then had to add an extension or rim to the top of each hive to make room for the bees.

The correct bee space around and between frames is approximately 5/16 of an inch. The minimum bee space is 3/16 of an inch and the maximum 6/16 of an inch. If the bee space is less than 3/16 of an inch the bees will fill the space with propolis and if it is greater than 6/16 of an inch they will build burr comb.

There are hives of different dimensions but the 10-frame so called standard hive is the one most commonly used. For further particulars concerning hives and bee appliances send to a reputable bee supply company for a catalog.

How and When to Start Beekeeping

There are at least four ways to start —capturing swarms, buying full colonies of bees, getting swarms out of bee trees or the sidings of buildings and purchasing packages of bees.

Colonies of bees purchased locally should be examined by a state bee inspector to make sure they are free from disease. Occasionally bees are purchased at sales without having been inspected. When this occurs, disease may be spread, especially if the bees are in an area where disease is prevalent.

It is possible to start an apiary from swarms of bees caught or purchased. A large swarm put into a hive at the beginning of the major honey flow is likely to store some surplus honey the same season. A small swarm put into a hive near the end of the honey flow may or may not store enough honey for winter food.

Some beekeepers cut bee trees to obtain swarms. This is rather strenuous work and from the standpoint of labor expended it is not likely to be profitable. Starting with package bees is by far the simplest and most profitable method of starting an apiary. If packages are installed early they may develop into colonies that will store some surplus before the close of the season. This is one way to get quick returns on an investment. It is an advantage to install packages at the beginning of the fruit bloom and dandelion honey flow so that the bees may store some nectar and pollen that will stimulate brood rearing.

The beginner should have his hives assembled with frames containing full sheets of foundation, in readiness for the packages when they arrive. Be sure to order bees early. Directions for assembling hives accompany the shipment. After the hives are in readiness for the bees they should be made mouse proof until they are set out in the apiary.

A Word to Those Having Bees

Bees in this area had a good cleansing flight during December. It is possible that bees in some northern areas did not have such a flight.

I have three small apiaries near Medina. I visit these yards occasionally during the winter to see how the bees are coming along. Of course I do not open the hives, although it does no harm to open an occasional hive to see that the bees are quiet and wintering well.

Snow Doesn't Hurt Bees

Some beekeepers are concerned about their hives being covered with snow. A covering of snow is a protection for the bees. Occasionally, an ice or sleet storm will close some hive entrances and if the cold continues, the

(Continued on page 127)

NEWS and EVENTS

MISSOURI
Midwestern Beekeepers' Association
Kansas City, Missouri
February 14, 1960

The Midwestern Beekeepers' Association will hold its regular monthly meeting in the I.O.O.F. Hall, 812 Westport Road, Kansas City, Missouri, at 2:30 P.M., Sunday, February 14, 1960. This meeting will feature a speaker and discussion on the subject "The Effect of Poison Sprays". Everyone welcome. —James A. Worrel, Secretary.

VERMONT
Beekeepers' Association, Inc.
Barre, Vermont
February 9, 1960

The winter meeting of the Vermont Beekeepers' Association, Inc., will be held February 9, 1960, at Country House Restaurant, Barre, Vermont, at 10:30 A.M. All honey to be exhibited at the V.F.S. has to be in by Monday, February 8, 1960, at the Vermont Farm Show which will be held in the Barre Auditorium. An interesting program has been planned. — William J. Damour, Secretary.

TEXAS
Nueces Beekeepers' Association
Corpus Christi, Texas

L. W. Lange has been elected 1960 president of the Nueces Beekeepers' Association of Texas. Other officers elected are Gene Crain, vice president; J. W. Johns, secretary-treasurer; J. W. Reed and Leilson Wilson, program chairmen. R. L. Clanton is also a member of the board of directors. The next meeting will be held on February 16 at the Junior Museum, Corpus Christi.

Houston Beekeepers' Association
December 8, 1959

On December 8, 1959, Houston Beekeepers' Association held their annual meeting for the election of officers for the coming year.

The new officers are: President, Mr. G. W. Payne; Vice President, Mr. G. R. Wylie; and Sec.-Treas., Mr. M. L. Basye, Jr.

The newly elected officers will take office on January 12, 1960.—Charles Eck, Sec.-Treas.

GEORGIA
North Georgia Beekeepers' Assoc.
December 16, 1959
Decatur, Georgia

The annual Christmas party of the North Georgia Beekeepers' Association was held at the Elks Club (B.P.O.E.) in Decatur, Ga., December 16th. Each member of the Association brought a Christmas wrapped gift for a child and these were delivered by past president, M. K. Fewell, to the Eggleston Memorial Hospital for Children. This is one of our annual projects, and one that these unfortunate children enjoy.

Members present pledged President Patton that we would "Keep Buzzing Around" for prospective members as well as getting the absentees back in harness of the association. Our association is an important one—or else it would not function so admirably today. President Patton urged that the members attend these meetings regularly every month as he will have a panel of three BEE experts at each meeting to answer any questions about bees and beekeeping that any member might ask and to be answered to our satisfaction.

At the close of the meeting the following officers were installed for 1960: President, W. G. Patton; 1st Vive President, J. W. Sheppard; 2nd Vice President, Wm. S. Sharp; Treasurer, G. T. Bennett; Rec. Secretary, David W. Johnson; Corres. Secretary, Eddie J. Karst; Chaplain, Rev. Fred L. Glisson. —Eddie J. Karst, Corres. Sec.

MASSACHUSETTS
Middlesex Co. Beekeepers' Association
February 27, 1960
Waltham, Massachusetts

The February meeting of the Middlesex County Beekeepers' Association will be held 6:30 Saturday, February 27, at the Waltham Field Station.

For the fourth lecture of the beginners' course in beekeeping, Harold Stevens will talk on Mechanics of Modern Bee Hive and Its Manipulation, Langstroth, Bee Space, Movable Frame, Foundation, Other Parts of the Hive, Smoker, Brush, Hive Tool, Veil, etc., Where to Locate Apiary, How to Start, and a discussion of Stings.

A question period will follow the speaker.—M. Southwick, Corres. Sec.

ILLINOIS
Cook DuPage Beekeepers' Association
February 20, 1960
Cicero, Illinois

The Cook DuPage Beekeepers' Association will hold its 39th annual meeting and banquet, Saturday, February 20, 1960, starting at 2 P.M., at Klass Restaurant, 5734 West Cermak Road, Cicero, Illinois.

A full program has been arranged and our speakers will be: Carl E. Killion, Chief Apiary Inspector, Paris, Illinois; Dr. V. G. Milum, University of Illinois, Urbana, Illinois; Alan Root, The A. I Root Co., Medina, Ohio; Dr. Mykola H. Haydak, University of Minnesota, St. Paul, Minnesota; Ellsworth M. Meineke, Meineke Honey Farm, Palatine, Illinois; and Charles C. Dadant, Dadant & Sons, Hamilton, Illinois, Master of Ceremonies.

Reservations for the banquet, 6:30 P.M., $3.50 per plate, can be made with E. J. Danz, 1025 N. Mapleton Avenue, Oak Park, Ill. Ph: Vi 8-7176 or A. J. Smith, 5835 W. 127th St., Worth, Ill. Phone: Fu 5-0153.

Anyone interested in beekeeping is welcome. Come and bring your friends. —A. J. Smith.

CONNECTICUT
Beekeepers' Association
February 27, 1960
New Haven, Connecticut

The winter meeting of the Connecticut Beekeepers' Association will be held February 27, 1960. The place scheduled is Britton Hall at the Connecticut Agricultural Experiment Station, Huntington Street, New Haven, Connecticut. The starting time is 10 A. M. Mr. Edmund Hamann is to be the featured speaker for the day. He will show a sound film titled "Essential Oils of Africa".

Lunch is pot-luck with coffee furnished. All beekeepers and friends are invited to attend the meeting. It promises to be an exciting program.—Philemon J. Hewitt, Jr., Publicity Chairman.

HONEY RECIPES FROM TEXAS
Old Texas Recipes

THAT IS the title of the new 38-page recipe book published by the Ladies' Auxiliary of the Texas Beekeepers' Association. The Texas ladies gathered together honey recipes that were the favorites of Texans and after a year of work and financial difficulties, have now made available this fine book. Postage paid copies of HONEY RECIPES FROM TEXAS are now available for 50 cents from Mrs. Jim Davis, Navasota, Texas. Subjects included among the recipes are beverages, breads, cakes, candy, pies, cookies, desserts, meats, salad dressings, salad toppings, vegetables, and honey baked beans.

HONEY IN YOUR BAKING
New Booklet Available

Tips on how to use honey in baked products, along with 28 tested recipes, are contained in a new Kansas State University Extension Service publication, "Honey in Your Baking," just off the press.

The publication is by John A. Johnson and Donald Miller of the K-State and is available upon request.

JENSEN'S PACKAGE BEES AND QUEENS

PACKAGES WITH DADANT "STARLINE" HYBRID QUEENS

	1-24	25-99	100-up
2 lb.	$4.80	$4.55	$4.30
3 lb.	5.90	5.65	5.40
4 lb.	7.00	6.75	6.50

Starline —QUEENS— Magnolia

$1.75 $1.65 $1.55 $1.45 $1.35 $1.25

Clipped and Marked Free.

PACKAGES WITH JENSEN'S "MAGNOLIA STATE" ITALIAN QUEENS

1-24	25-99	100-up
$4.50	$4.25	$4.00
5.60	5.35	5.10
6.70	6.45	6.20

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PURE FRESH ROYAL JELLY

PACKAGES WITH MIDNITE QUEENS

LITTLE'S

ITALIAN QUEENS

1 to 24 ..... $1.45
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ITALIAN QUEENS

BREEDERS SELECTED FROM OUR NORTHERN APIARIES FOR HARDINESS AND HONEY PRODUCTION. AIR MAIL DELIVERY ON ALL QUEENS:

Jan. through May . . . $1.25 each
June through Sept. . . . .75 each

Write for prices on Package Bees Eby's Permanent Foundation and bee supplies. We are in the market for wax.

Walter D. Leverette Apiaries
R. L. LEVERETTE, MGR.
P.O. Box 364 Ft. Pierce, Florida

NORMAN'S
PACKAGE BEES and QUEENS

Now is the time to book your orders for early spring and summer delivery. Book them with me and be sure of getting pure, bright, 3-band Italian bees and queens. Safe arrival and satisfaction guaranteed. 10% down books your orders. Balance 10 days before shipment.

Untested Queens . . . $1.00
Tested Queens 2.00
2-lb. pkg. w/q 3.75
3-lb. pkg. w/q 4.75

JOHN A. NORMAN
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No Matter What Your Interest

Whether you are a Commercial Beekeeper; a Sideline Beekeeper; or a Beginner Beekeeper,—you'll find what you want in ABJ. PLUS Science and Industry; Honey Plants; Meetings; Crops and Markets—AND your questions answered FREE.

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Spring queens until May 5.

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1-10	$1.50	$1.80
10-25	1.35	1.65
25 or more	1.20	1.50
After May 5		
le s than 25	$1.10	$1.40
25 or more	1.00	1.30

Place your order with us and be assured of top quality queens and prompt, courteous service.

GEO. E. SMITH & SON
Rt. 4, Box 59 Yuba City, Calif.
Phone SHerwood 2-3511

Asked & An

Bees 30 Miles From Home That Need Spring Feeding

Q. What would be the best way of feeding sugar?—W. B. D., Ind.

A. The best way we know of is to put the granulated sugar on the inner cover with the center block of the inner cover removed, so that the bees can easily get up through the opening of the cover and take the sugar. The ordinary inner cover with rim, will hold approximately three pounds of granulated sugar, if filled level full. Three pounds of sugar is equal to a five pound pail of thick sugar syrup.

If you pack your hives for winter or put a covering of black building paper around them, it would, of course, be necessary to open the top of your hives, after the paper is removed temporarily, in order to feed the sugar. If you do not pack your bees for winter, feeding would be a very simple matter.

Since colonies of bees start brood rearing quite early in the spring, during late February, it would be well to get the sugar onto the hives the latter part of the winter. This method of feeding has some distinct advantages in that the opening in the inner cover is directly above the cluster of bees and the heat from the cluster, rising to the upper portion of the hive, makes it possible for bees to get up through the small opening in the inner cover to take the sugar provided the weather is mild enough to permit bees to break their cluster. The bees do need some moisture to liquefy the granulated sugar but ordinarily such moisture is available within the hive, since there is some condensation of moisture on the outside of the cluster during the winter.

What to do with Empty Supers and Excluders During the Winter

Q. Do I leave the queen excluder on top of the food chamber for over the winter and after I extract the honey from the shallow supers, do I put them on top of the food chamber over winter? —S.F., Penna.

A. It does no harm to leave the queen excluder on top of the food chamber during the winter. You would, of course, put the inner cover over the queen excluder, then the outer cover on top. Some beekeepers may leave the queen excluder between the food

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chamber and the bottom brood chamber during the winter. This is a mistake, because, when the cluster moves into the upper chamber (commonly called the food chamber) during cold weather, the queen being unable to pass through the queen excluder in order to be in the center of the cluster, will be stranded in the lower chamber and will, of course, die.

It would be well to store your empty shallow supers in your mouse proof honey house during winter months.

Processing Honey Before Bottling

Q. I am a hobbyist beekeeper who has extracted a sizeable amount of honey this year. I have read about the limited, controlled heating of honey to preserve its flavor. Would you please send me the temperature and time required to heat honey before bottling.—R. G., Mass.

A. Some large bottlers of honey heat the honey to a temperature around 155 or 160°F. for a short time, about 30 minutes, then cool it before bottling. If the honey is held at a temperature of 160° for too long a time it may darken somewhat and impair the flavor. Large bottlers of honey have water-jacketed tanks for processing the honey. The honey is brought to the desired temperature for the proper length of time, then the hot water in the jacket of the tank is replaced with cold water. There is an agitator circulating in the tank which keeps the honey in motion, so that the honey near the outside of the can will not become overheated.

A small bottler who does not have such a processing outfit can heat honey in a wash boiler. Such a container will hold two 60 pound cans of honey. The cans should rest on small pieces of wood so that water can circulate underneath the cans. The wash boiler should be placed on a gas hot plate. It is not necessary to bring the water to a boil. It would be an advantage to have a liquid thermometer, to place in the can of honey while it is being heated, in order to measure the required temperature. It would be necessary also to stir the honey in the 60 pound can with a stick. This should be done periodically during the short time the honey is being heated to approximately 160°F.

New Price Schedule for 1960

APRIL BEES

2-lb. pkg. with queen $4.50
3-lb. pkg. with queen 5.50
QUEENS, each 1.45
10 or more, each .. 1.25

MAY BEES

2-lb. pkg. with queen $4.00
3-lb. pkg. with queen 5.00
QUEENS, each 1.25
10 or more, each .. 1.10

10% DISCOUNT on orders booked 30 days in advance of shipping date.
10% DISCOUNT to recognized dealers and Co-ops on all orders. (Only one discount to apply.)

SHIPMENT by Parcel Post or Express. For Parcel Post add $1.30 for 2-lb. package, $1.50 for 3-lb. package.

BOOK orders without deposit.
REMIT before shipment.

J. F. McVay
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ITALIAN QUEENS
1-24 ..... $1.10 25 up $1.00
Dan W. Alvies
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Booking orders now.
Over 35 years a shipper.
Send for FREE Circulars.

BLUE BONNET APIARIES also HOME of AULT BEE FARMS
Weslaco, Texas

PACKAGE BEES — QUEENS
CAUCASIANS—MIDNITES—ITALIANS
We do our best to serve you with the best.

QUEENS

1 to 24 ..... $1.50 each
25 to 99 ..... 1.40 each
100 up ..... 1.30 each
Add 25¢ each for Midnite queens.

PACKAGE BEES

	2-lbs. w/q	3-lbs. w/q
1 to 24	$4.40 each	$5.60
25 to 99	4.20 each	5.30
100 up	4.00 each	5.10

Add 25¢ per pkg. for Midnite Queens
No charge for clipping and marking.
Write for prices on truckloads with exchange of cages.

THE COFFEY APIARIES
Whitsett, Texas
Express and telegraph office:
Three Rivers, Tex. Tel.: Campbellton 7-2525

Buy and Sell

Classified rates: 18¢ per counted word, each insertion. Each initial, each word in names and addresses, the shortest word such as "a" and the longest word possible for the advertiser to use, as well as any number (regardless of how many figures in it) count as one word. Copy should be in by the 10th of the month, preceding publication.

HONEY FOR SALE

WE BUY AND SELL all varieties of honey. Any quantity. Write us for best prices obtainable. HUBBARD APIARIES, ONSTED, MICHIGAN.

IOWA honey, one can or truck loads. RUSSELL D. SMALLEY, BEAVER, IOWA.

CLOVER extracted honey in sixties. ABRAM BRUBAKER, 1525 September Dr., LANCASTER, PA.

TUPELO, wild flower in 60's. Honey candy. LANCASTER COUNTY DUTCH GOLD APIARIES, 910 State Street, LANCASTER, PA.

HONEY—In any size container, also Mail Order Dealer for Bee Supplies. Write for prices. L. E. ALLEN, TIPTON, MICH.

SECTION COMB HONEY by March 1st. JOHN SEITZ, 3 Palms Trailer Park, TAVARES, FLA.

EXTRACTED HONEY—White clover honey in new sixties. WAHLS APIARIES, CHENOA, ILLINOIS.

HONEY AND WAX WANTED

BEEKEEPERS TAKE NOTICE—We cannot guarantee honey buyers' financial responsibility, and advise all beekeepers to sell for cash only or on C.O.D. terms except where the buyer has thoroughly established his credit with the seller.

WANTED—All grades of extracted honey. Send sample and price. DEER CREEK HONEY FARMS, LONDON, OHIO.

CASH FOR BEESWAX. Write as to quantity and we will quote price. MUENCH-KREUZER CANDLE CO., INC., SYRACUSE, N. Y.

WANTED—White extracted or comb honey. Send sample. MILLERSPORT HONEY CO., MILLERSPORT, OHIO.

BEESWAX WANTED—Highest prices paid in cash or trade for bee supplies. THE A. I. ROOT COMPANY, MEDINA, OHIO; COUNCIL BLUFFS, IOWA; SAN ANTONIO, TEXAS.

WRITE FOR SHIPPING TAGS and quotations on rendered beeswax. We buy from one pound up and if you have over 25 pounds let us work it into foundation for you at a 25 per cent saving. WALTER T. KELLEY CO., CLARKSON, KY.

WANTED — Light amber clover, fall flowers, buckwheat and white clover. Send sample and lowest price. CLOVERDALE HONEY CO., FREDONIA, N. Y.

WANTED—Buckwheat and light amber honey. EASTERN FOOD PRODUCTS, 421 BEDFORD AVE., BROOKLYN, N. Y.

WANTED, chunk comb and extracted honey. Mail sample and price. STOLLER HONEY FARMS, LATTY, OHIO.

WANTED—White and Extra Light Amber Honey, 60 pound Cans or Drums. HUBBARD APIARIES, ONSTED, MICHIGAN.

WANTED—Honey in 60 pound cans, also beeswax any quantity. L. E. ALLEN, TIPTON, MICH.

HONEY WANTED for bottling, bakers including buckwheat. All types, in tins or drums, trailer loads. Send samples representing each lot. ALSO ROYAL JELLY. Write CHAS. E. FARRIS CO., 99 HUDSON ST., N. Y. City. Established since 1910.

We render cappings, old combs and buy your beeswax. Shipping tags sent on request.—M. R. CARY CORP., 219 WASHINGTON SQUARE, SYRACUSE 8, N. Y.

WANTED: Honey—water-white, light amber and buckwheat extracted and comb. Send samples and prices. M. R. CARY CORP., 219 Washington Square, SYRACUSE 8, NEW YORK.

WANTED—comb, chunk, and extracted honey. Send sample and price. RONALD CULP, CIRCLEVILLE, OHIO.

ALL GRADES extracted honey wanted in both 60 pound cans and 600 pound drums. PRAIRIE VIEW HONEY CO., 12303 12th St., DETROIT 6, MICHIGAN.

TOP PRICE for buckwheat or dark amber. M. P. TRAPHAGEN, HUNTER, N. Y.

FOR SALE

WRITE FOR CATALOG—Quality Bee Supplies at factory prices. Prompt shipment. Satisfaction guaranteed. HUBBARD APIARIES, Manufacturers of Beekeepers' Supplies and Comb Foundation, ONSTED, MICHIGAN.

THE BIGGEST BEE SUPPLY Catalog published (64 pages) free for the asking. Listing many items not found in other catalogs. No agents—buy direct and save 20%. WALTER T. KELLEY CO., CLARKSON, KENTUCKY.

QUEENBEE PAINTING OUTFITS, $1.50. INTERLOOKERS, $3.00 postpaid. SOUTHWICK APIARIES, WABAN, MASS.

FREE CATALOG—Cypress bee hives and bee supplies. Save up to 40% on hives that last. MYERS CRAFT MANUFACTURING CO., BURGAW, NORTH CAROLINA.

700 HIVES—10-frame outfit. Excellent honey pollination locations. N. Central Calif. BOX 28, GLEANINGS.

FOR SALE—Used 20-frame Root Simplicity extractor with honey pump and motor, Colman gas stove, galvanized steam boiler, steam knife, 45-gal. honey tank, cappings tank, complete extracting outfit. Everything in good condition, $250. GLEN BARGER, CAREY, OHIO.

FOR SALE—800 one story 10-frame hives of bees, $8.00 per colony, midwest, discount truck lots. Health certificate furnished. BOX W.B.F., GLEANINGS, MEDINA, OHIO.

BEST WHITE GRANULATED SUGAR BY THE BAG or truckload. Good stock at all times for Bee Feed. HUBBARD APARIES, ONSTED, MICHIGAN.

SULFA—TM-5 — TM-25 — for AFB and EFB. Ask for our low bulk prices. HUBBARD APIARIES, ONSTED, MICHIGAN.

FOR SALE—Complete, modern, up-to-date, fully equipped bee business. 700 colonies. 40 by 80 two story honey house. Three bedroom modern home. Retiring. J. D. HARRAH, CHARLO, MONT.

TWO EXTRACTORS, 2-frame, swing baskets, good condition, $50.00 each. One Novice 2-frame, $15.00. Will trade or I will buy hives locally. TRIPLE T HONEY RANCH, 633 Dawn Place, DOWNERS GROVE, ILLINOIS. Send card.

FOR SALE—1500 sheets 13 3/4" x 13 3/4" Filter paper still in original cartons. HUBBARD, ONSTED, MICHIGAN, Phone HO 1-3481.

1955 FORD F-600, 16 ft. steel bed, side racks, recent engine overhaul, good rubber, Don-Lo loader working but has damaged arm and carriage, $1,775.00 cash. May take honey, beeswax, bees or queens. NARD MILLER, 67 East 33rd South, SALT LAKE CITY, UTAH.

$$$$$ FRAMES & SUPERS — Factory prices. Frames 9 1/8, 1-100, 12¢; 100-1000, 10¢; 1000 or more, 8¢. Supers, 9 5/8 depth, 1-12, $1.35; 25-100, $1.25; 100-1000, $1.15. Write for free catalog. KEHM BROTHERS APIARIES, Box 346, Rt. 1, GRAND ISLAND, NEBRASKA. Located 2 miles North of Drive-Inn Theater.

FOR SALE—On account of health, 50 two story colonies of bees, $12.00 each. 200 shallow supers with drawn combs at 95¢ each. L. M. HUNTER, 317 Eddy Street, ITHACA, N. Y.

BEES AND QUEENS FOR SALE

We use all possible care in accepting advertisements but we cannot be held responsible in case disease occurs among bees sold or if dissatisfaction occurs. We suggest that prospective buyers ask for certificate of inspection as a matter of precaution.

CARNIOLAN and CAUCASIAN Bees for 1960. Booking queens. Each, $1.00; 2-pound bees with queen, $4.00. 3-pound bees with queen, $5.00. LEWIS & TILLERY BEE CO., RT. 3, BOX 251, DU 2-8371, GREENVILLE, ALABAMA.

250 HIVES OF BEES or any part of them, $10.00. EN-5-4208, H. A. FRANKE, UVALDE, TEXAS.

WALKER'S high producing Italians, 3-lb. with queen, $5.25; 2-lb., $4.25, extra queens, $1.35. Discount on large orders and truck loads. Also comb nuclei. G. C. WALKER, Box 894, PHARR, TEXAS.

200 NUCLEUS hives, 4 or 5 frame nucs, available April 15th. ROBERT GOUGH, Route 5, Box 196, EUGENE, OREGON.

THREE BAND Italian and Carniolan Bees, 3-lb., $5.00; 5-lb., $6.90. Queens, $1.30. LUTHER PICKETT, EFLAND, N. C.

HELLO FOLKS, my father NORMA ROY has retired from the bee business because of his age and health. I will continue offering good quality and good service. Italian bees with queen, 3 pounds, $4.50; 4 pounds, $5.25. Queenless packages, deduct $1.10. Live delivery, full weight and health certificate guaranteed. JOE ROY APIARIES, HESSMER, LA.

BOOSTER BEES—70 cents pound in your cages after May 15. Can supply new cages and queens. A V. DOWLING, North St., VALDOSTA, GA.

HONEY LABELS
Improved designs, embodying color, balance, simplicity, and distinction. Please send for free samples & prices.
C. W. AEPPLER COMPANY
Oconomowoc, Wisconsin

"SWARMING STOPPED COLD"
95% Foolproof
No Gimmicks
No Gadgets
No Tricks
Bigger Crops - Better Beekeeping
Full Directions Price $1.00
BAKER'S APIARIES
Glencoe Illinois

Exchange Your Beeswax For Foundation
Write for Price List.
WAX WORKERS, INC.
1330 Slaterville Road Ithaca, N. Y.

CANADA'S
National Monthly Magazine for Beekeepers
Canadian Bee Journal
Streetsville, Ontario, Canada

HARPER'S FAMOUS
HIGH QUALITY ITALIAN
QUEENS & PACKAGE BEES
For 1960

	Queens	2 lb. w/q	3-lb. w/q
1-29	$1.25	$4.00	$5.00
30 & Up	1.15	3.75	4.75

All Queens Postpaid, Airmail. Health Certificate and Live Arrival Guaranteed. Please let us have your requirements early.
CARLUS T. HARPER
New Brockton, Alabama

HOLLOPETER'S
HARDY NORTHERN ITALIAN QUEENS
June-November. Our 49th year.
WHITE PINE BEE FARMS Rockton, Pa.

PACKAGE BEES, QUEENS—Best Quality and Service. Write for prices. HUBBARD APIARIES, ONSTED, MICHIGAN

BULK BEES, April-May, 1960—60¢ lb. Central Calif. U haul 20 lb. pkgs. $2.00 deposit on pkgs.; full refund if returned in ten days. HARRIS HONEY EQUIPMENT SALES, 8192 E. 20th Street, WESTMINSTER, CALIFORNIA. TW 3-0115.

DADANT STARLINE HYBRIDS—QUALITY QUEENS and PACKAGE BEES. Queens, $1.70 each, Airmailed. 2-lbs. bees with queen, $4.95, ship. wt. 6 lbs. 3-lbs. and queen, $5.70, wt. 7 lbs. Add postage if by mail. Express collect. For Italian queens deduct 45¢ per queen. Quantity prices on request. Book early without deposit. Shipments begin April 1st. Full weight, live bees, at destination, personal service. Health certificate. Queens clipped and marked if desired, 10¢. S. J. HEAD, CROSSETT, ARKANSAS. WHERE YOUR BUSINESS IS APPRECIATED.

ROYAL JELLY

ROYAL JELLY capsules (with added vitamins) 25 mg. box of 30, $2.15, 50 mg. box of 30, $3.50. New Pack (without vitamins) $7.50 per 100. Beauty Cream, 2 oz., $2.00. PRAIRIE VIEW HONEY CO., 12303 Twelfth Street, DETROIT 6, MICH.

ROYAL JELLY—$12.00 per ounce, postpaid. Write for prices in large lots. THE STOVER APIARIES, MAYHEW, MISS.

SUPER STRENGTH 100 mg. Royal Jelly capsules in bottles of 100 for $10.00. PRAIRIE VIEW HONEY CO., 12303 Twelfth St., DETROIT 6, MICH.

12 pounds ROYAL JELLY at $10.00 per ounce. GARON BEE COMPANY, DONALDSONVILLE, LA.

SEEDS

HONEY PLANTS—ask for illustrated 1960 catalog. BEE GARDEN SPECIALS: seed, one packet each, five unusual honey plants, $1.00; plants, 4 to 6 each, six unusual nectar perennials, labeled, $5.00; postpaid. PELLETT GARDENS, Atlantic, Iowa.

RAPE SEED, Argentine or Polish, $15.00 per CWT U. S. Funds, f.o.b. Winnipeg. BRETT YOUNG SEEDS, LTD., WINNIPEG 13, CANADA.

WANTED

WANTED — Wax foundation machine, hand operated. Write details and price to: MIEL CARIBE, INC., FLORIDA, PUERTO RICO.

WANTED—300 colonies bees, 10-frame hives. Deep supers preferred. Also wanted, high pressure steam boiler. BARKMAN HONEY CO., HILLSBORO, KANSAS.

HELP WANTED

EXPERIENCED bee man year round employment. VANDERFORD-HINKLE APIARIES, 701 So. Main, ELLENSBURG, WASHINGTON.

WANTED—Beeman for Louisiana or South Dakota. LIONEL HOPKINS, MARINGOUIN, LA.

WANTED: Seasonal or year around man for our apiary work. HOWARD WEAVER & SONS, NAVASOTA, TEXAS.

HELP WANTED—Top experienced man in large bee business, $400.00 per month and more. M. E. BALLARD, ROXBURY, N. Y.

POSITION WANTED

SINGLE MAN, 36, now employed at Alaska Experimental Farm, would like permanent position preferably in Washington or Oregon. Several years experience as small beekeeper. WM. F. BACHMAN, Box 558, COLLEGE, ALASKA.

MISCELLANEOUS

BEES REMOVED from house or tree or hive without touching either house or bees. Bees will then move honey into hive. Save property, honey, and bees with my method. Send $2.00 for details. Satisfaction guaranteed. GEORGE HAWKINS, RT. 1, LAWSON, MO.

SWARM CONTROL—Our Bee swarming has been most satisfactorily controlled since using "Baker's Swarm Manipulation." Yard averaged 270 lbs. (Testimonial: S. & H. Apiaries, Chicago, Illinois) For further details see Ad by BAKER'S APIARIES

MAGAZINES

THE SCOTTISH BEEKEEPER (The official organ of the Scottish Beekeepers' Association.) Scottish in character, international in appeal. Annual subscription $2 post free. Sample copy from ROBERT N. H. SKILLING, F.S.C.T., 87 KING STREET, KILMARNOCK, AYSHIRE.

Archiv fur Bienkunde, International journal for Bee Culture and beekeeping economics. Founded in the fall of 1918. Oldest economic bee journal in the world. Praised again and again for its decades of independent leadership through many endorsements and advice as a valuable source also for the practice. Classic. Yearly DM 5.50. Any aspiring beekeeping friend will receive a sample copy. BIENEN VERLAG, GIELBELBACHSTR. 19, LINDAU (B) GERMANY.

INTERESTED in Angora Goats? Read the Sheep and Goat Raiser, Hotel Cactus, Box 189, San Angelo, Texas, the only ranch magazine published serving the Angora Goat Industry. Subscription $3.00. Sample copy 25c.

BEE WORLD, the international journal of the Bee Research Association published monthly, contains the latest research reports on bees and beekeeping. With Apicultural Abstracts it costs $5.50 per annum, or $6.00 including membership of the Bee Research Association. Apicultural Abstracts only $4.50 per annum from the Hon. Subscription Secretary, Bee Research Association, 10 BARNETT WOOD LANE, ASHTEAD, SURREY, ENGLAND.

PROFIT AND HEALTH—Raise dairy goats. Learn how. Monthly magazine, $2 yearly; sample and information 25¢. DAIRY GOAT JOURNAL, COLUMBIA T3, MISSOURI.

INDIAN BEE JOURNAL, know interesting facts concerning the honeybees of India. The only Bee Journal of India published in English. Subscription Rs 12/- or Sh. 17/6d (Sterling) or $2.75 per year (INTERNATIONAL M.O.). Sample copy 2s. or 25 cents. Can be had from: The Managing Editor, Indian Bee Journal, Naini Tal, U.P., India.

J. E. WING & SONS
47 Years Continuous Service
Italian Package Bees
and Queens
Our Specialty
Knights Landing, Calif.

"BEE" MY VALENTINE

(Continued from page 101)

Honey Wafer Sandwiches

Two cups sifted flour, 1 teaspoon baking soda, ½ teaspoon cinnamon, ¼ teaspoon ground cloves, ¼ teaspoon allspice, ½ cup whole bran cereal, ½ cup soft butter and ½ cup honey.

Sift together flour, soda and spices. Crush cereal slightly. Blend butter and honey. Add sifted dry ingredients and cereal, mixing thoroughly. Chill. Roll chilled dough out on lightly floured board to about 1/16-inch thickness. Cut in heart shapes and place on greased baking sheets. Bake in moderate oven, 350°F. about 10 minutes. Cool. Make sandwiches by spreading cookies with confectioners' sugar icing and topping each with a second cooky. Icing may be tinted with red food coloring or sprinkled with red sugar. Yield: 30 double cookies.

Honey Date Filled Cookies

One-half cup soft shortening, ⅓ cup sugar, 1 egg, ⅔ cup honey, 2¾ cups sifted flour, 3 teaspoons baking powder, ½ teaspoon salt, 1 teaspoon ginger, ½ teaspoon cinnamon and date filling.

Cream shortening with sugar, add egg and honey; beat well. Sift dry ingredients together and add to creamed mixture; beat well. Wrap in wax paper. Chill. Roll out ⅛-inch thick on lightly floured board. Cut in heart shapes and put two together with about 1 teaspoon of the date filling. Yield: 4 dozen.

For the date filling you will need 1 cup dates, cut fine, ½ teaspoon finely grated lemon rind, 1 teaspoon lemon juice, ⅓ cup honey, ⅓ cup water, and 1 cup finely chopped walnuts, optional.

Combine first five ingredients; cook, stirring till thick. Add nutmeats and cool.

The New Zealand Beekeeper
The Quarterly Magazine of the National Beekeepers' Association of New Zealand. Better Beekeeping—Better Marketing Subscription, 8 shillings per year, payable to
THE GENERAL SECRETARY
Box 19 Foxton, New Zealand

THREE BANDED ITALIAN PACKAGE BEES & QUEENS

Shipped anywhere in United States or Canada
1960 Prices - FOB Hampton, S. C.

Quantity	Pkgs. 1 - 25	Pkgs. 25 - 99	Pkgs. 100 up
2 lb. w/q	$4.00	$3.80	$3.60
3 lb. w/q	5.00	4.80	4.60
4 lb. w/q	6.00	5.80	5.60
5 lb. w/q	7.00	6.80	6.60
Extra Qns.	1.45	1.35	1.25

Queenless Packages deduct $1.00 per pkg.
Queens Clipped and Marked 10¢ each extra.
Shipment starts April 1st weather permitting.
Guaranteed safe arrival.
Health Certificate with each shipment.

TERMS: One-third with order, balance 20 days before shipment.

H. C. BRUNSON
P. O. Box 188
Hampton, S. C.
Phones 2151 — 6111

The time is drawing near:

Have you made your decision regarding the number and time you want

PACKAGE BEES

Place that order now. Usually we can start shipping March 20.

With Reg. Qn.	1-24	25-99	100 up
2 lb. bees	$4.50	$4.25	$4.00 ea.
3 lb. bees	5.70	5.45	5.20 ea.

For Island Hybrid add 30¢ each to above.

Queens clipped unless otherwise ordered. Marking queens 10¢ each extra.

"They Produce"

Rossman Apiaries

P.O.Box 133 Moultrie, Ga.
Phone: YUkon 5-6660

TEXAS CAUCASIAN QUEENS AND PACKAGES

	1-24	25-99	100 up
2-lb. pkg. w/q	$4.50	$4.25	$4.00
3-lb. pkg. w/q	5.60	5.30	5.00
Queens	1.45	1.35	1.25

All queens personally produced by J. E. Hastings and his breeding stock. Bred for non-swarming, very gentle, good honey producers. Health certificate, weight, and live arrival guaranteed.

KANES APIARIES
Route 1, Box 200 Hallettsville, Texas

ITALIAN BEES & QUEENS
3 lb. with queen $4.20
4 lb. with queen 5.10
Extra queens 1.15
For queenless pkg. deduct price of queen. Live delivery and health certificate guaranteed. 10% cash books your order.
DAIGREPONT APIARIES
HESSMER, LA.

ITALIAN BEES & QUEENS
2-lb. pkg. w/q $3.75
3-lb. pkg. w/q 4.75
4-lb. pkg. w/q 5.75
Queens 1.00
Liberal overweight, safe arrival guaranteed, with health certificate furnished.
NORMAN BEE CO. Rt. 1 RAMER, ALA.

Queens

Italians — Caucasians

	1 to 99	100 up
2-lb. pkg. w/q	$3.45	$3.35
3-lb. pkg. w/q	4.45	4.35
Nice large queens	1.00	.95

To air mail queens, add 5¢ each queen
Queens clipped and painted, 10¢ each queen.
Early March Queens.
All queens are personally reared, shipped when you want them, and your order appreciated.
Order 1 or 1000

Mitchell's Apiaries
Bunkie, La.

BEE SHIPPERS' LABOR PROBLEMS

(Continued from page 103)

The time when shippers can go fishing or hunting is limited and if too much time is spent on pleasure, trouble will develop and income will drop according to the time spent on pleasure. Time is money and the more time you spend away from the business, the less the returns.

You can conclude from this discussion that we have more work than we can afford to do if we have to depend only on producing package bees and queens.

RESEARCH REVIEW

(Continued from page 93)

the entire colony in which the queen had been introduced was destroyed. Mr. Claude J. Burgin, chief apiary inspector for the State of Texas is to be congratulated as well as the others concerned, on their prompt action and cooperation in removing a potential threat.

More on the Acarine Mite:

FOLLOWING THE report of finding the external Acarine mite in Australia on bees from California, Dr. J. E. Eckert searched and found these external mites in California. He subsequently contacted several state and provincial apiculturists and in a recent letter states that the external mite has been found in Canada (British Columbia and Alberta), and in Massachusetts. It is also reported indirectly that it has been found in Utah and Louisiana. Dr. Eckert is now gathering more information on the subject and hopes to make a more complete report at a later date.

On Heart Sunday
February 28
Feb. 28
GIVE ® to *Fight* Heart Disease

PACKAGE BEES "GULF BREEZE" ITALIAN QUEENS

Our modern business is prepared to serve you efficiently and with assurance of a fair deal. This is our 50th year with the bees which gives us the experience to do a good job.

QUANTITY	QUEENS	2 lb. pkg. w/q	3 lb. pkg. w/q	4 lb. pkg. w/q
1-9	$1.30	$4.50	$5.70	$6.90
10-49	1.25	4.25	5.45	6.65
50-Up	1.20	4.00	5.20	6.40

Clip and paint 5¢ each extra

BESSONET BEE COMPANY **Donaldsonville, La.**

PLANT'S BEES

Year after year dependability quality service.

	1 to 9	10 to 50	51 up
2-lb. pkg. with queen	$4.50	$4.25	$4.00
3-lb. pkg. with queen	5.70	5.45	5.20
Queens	1.45	1.35	1.25

Larger packages at $1.20 per each additional pound. No charge to clip, mark, airmail queens.

W. E. PLANT Rt. 2 Hattiesburg, Miss.

PACKAGE BEES AND QUEENS

Walker-Lee Co. Live Oak, Calif.

QUALITY IN PACKAGE BEES AND QUEENS

Caucasian or Italian, gentle, highly productive. Health certificate, live arrival guaranteed.

Lots of	Queens	2 lb. w/q	3 lb. w/q	4 lb. w/q	5 lb. w/q
1 to 25	$1.50	$4.25	$5.35	$6.45	$7.55
26 to 99	1.35	4.00	5.05	6.10	7.15
100 up	1.20	3.75	4.75	5.75	6.75

FARRIS HOMAN **SHANNON, MISS.**

BETTER BRED QUEENS — Three Banded Italians

Are you getting ready for the 1960 Bee Season? At least you are planning. Our BETTER BRED STOCK will add to your profits this year. Let us book your order. No deposit required. Our queen yard will be Fumidil B treated this year. Phone Valley 9-6183 after 7 P.M.

	Queens	2 lb. w/q	3 lb. w/q
1 to 24	$1.40	$4.25	$5.35
25 to 100	1.15	3.75	4.75

CALVERT APIARIES **CALVERT, ALABAMA**

ITALIAN & CAUCASIAN BEES AND QUEENS 1960 PRICES

Bees that stand test for Honey Gatherers, Gentleness, and very prolific. Bred from select hives, Fumidil fed grafting and queen yards. A certificate of health and live delivery guaranteed. All queens Air Mail. Tested Queens, each, $2.50.

	2 Lb.	3 Lb.	4 Lb.	5 Lb.	Queens
1 - 24	$4.50	$5.50	$6.50	$7.50	$1.45
25 - 99	4.25	5.25	6.25	7.25	1.35
100 - up	4.00	5.00	6.00	7.00	1.25

We are prepared to fill all orders promptly. .Come after your bees or have them shipped Express or Parcel Post. Send $1.00 per package deposit, balance two weeks prior to shipping date. Parcel Post, add for 2 Lb. $1.30; 3 Lb. $1.50. Larger packages add $2.50.

SEND US YOUR ORDER FOR 1 or 1,000 — TRY US.

G. D. McCARY & SON BEE CO. BUCKATUNNA, MISSISSIPPI

We are the exclusive distributor for Eby's Permanent Foundation. If you are west of the Mississippi River and are interested in becoming a dealer, please contact us. We have a market for your honey and beeswax. Rendering is our specialty. Send us your cappings, slum gum, or old combs:

Wally's Bee Enterprise, Inc.

1909 East 4th Street Sioux City, Iowa

"Write for our 1960 Bee Supply Catalog."

Shoot for profit - - - - Shoot for the STAR

Order STARLINE queens this season and profit.

PACKAGE BEES WITH QUEENS	2 lb.	3 lb.	4 lb.	QUEENS Starline	QUEENS Italian
1-24	$4.50	$5.70	$6.70	$1.70	$1.40
25-99	4.25	5.45	6.45	1.60	1.30
100-Up	4.00	5.20	6.20	1.50	1.20

Packages with Starline queens, add 30¢ per package.
Clipping 5¢ each queen, marking 5¢ each queen.

Reg. U. S. Pat. Off.

ALL QUEEN ORDERS SHIPPED POSTAGE PREPAID TO YOU.

GARON BEE COMPANY DONALDSONVILLE, LA.

Package Bees "Italians" Queens

Never before have good packages and queens been so important. Serving those who demand the best. Write for circular.

— PRICES —	1-9	10-49	50 up
2 lb. pkg. with young laying queen	$4.50	$4.25	$4.00
3 lb. pkg. with young laying queen	5.50	5.25	5.00
4 lb. pkg. with young laying queen	6.50	6.25	6.00
Extra Queens	1.50	1.40	1.30

Shipments by Express, Parcel Post or your Truck — Quality Does Not Cost — It Pays

THE WILBANKS APIARIES Claxton, Georgia

A TALK TO BEEKEEPERS

(Continued from page 112)

circulation of air might be cut off and result in a loss of some colonies. However, if there is a small upper or middle entrance in the front of each hive, the bees will not smother.

When bees have an ample amount of stores and are protected against the cold weather there is nothing that can be done to improve their condition during the winter.

NORMAN BROS.
BEES & QUEENS
BRIGHT 3-BANDED ITALIANS

You can count on us. For fine quality bees and dependable service. 10% will book your order and reserve shipping date. Full weight, safe arrival, health certificate and satisfaction in U. S. A. and Canada.

39 Years as Shippers

— Prices —	1-11	12-100
2 lb. pkg. with queen	$4.00	$3.75
3 lb. pkg. with queen	5.00	4.75
Untested queens	1.10	1.00
Untested queens	1.10	1.00

NORMAN BROS. APIARIES
RAMER, ALABAMA

CARNIOLAN & CAUCASIAN QUEENS

These queens are Line-Bred for many generations for honey production, gentleness and early build-up. Will meet your every need in beekeeping. Booking for early March delivery.

Queens .... $1.45 each, Air Mail
Quantity discount. Safe delivery in U. S. and Canada only.
Foreign .... $2.50 each, Air Mail

W. D. REAMS
Box 458 LaBelle, Fla.

WILLIAMS ITALIAN QUEENS
LARGE LEATHER COLORED
THREE-BANDED
QUALITY SUPREME
CERTIFICATE WITH EACH SHIPMENT

1-9 Air Mail	$1.25 each
10-99 Air Mail	1.15 each
100 Up Air Mail	1.05 each

Queens clipped, 10¢ each, additional

PACKAGE BEES

	1-9	10 & up
2-lb. w/q	$3.80	$3.60
3-lb. w/q	4.80	4.60

Packages F.O.B. Shipping Point

DR. WILLIAMS APIARIES
115 W. Sterling Ave. Baytown, Texas

NUCLEI MADE TO ORDER
4 frames with plenty of bees and young queen. $5.00 in your equipment. PACKAGES and CAUCASIAN QUEENS.

DELMAR L. SMITH
1954 Scenic Ave. Central Point, Oregon
A Lifetime Among the Bees.

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The senior beekeeping journal of the Southern hemisphere provides a complete cover of all beekeeping topics in one of the world's largest honey producing countries. Published monthly by Pender Bros. Pty. Ltd. Box 20, P. O., Maitland, 3N, N.S.W., Australia. Subscription by Bank Draft or International M. O. Australia and New Zealand 15/- per annum (in advance) post. paid. British Isles and British Dominions 18/- per annum (in advance) post. paid. Other overseas countries 20/- per annum (in advance) post. paid. Sample copy free on request.

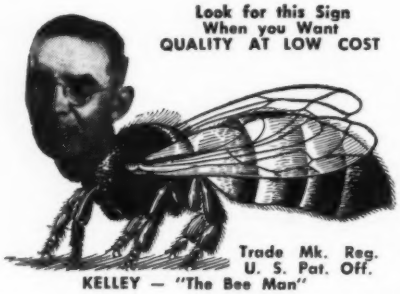
Northern Tested QUEENS
. . . from . . .
A Dual Strain
. . . backed by . . .
20 YEARS BREEDING
40 YEARS KNOW HOW
ITALIANS ONLY
PRODUCERS
Not the most . . . or the cheapest . . .
BUT THE BEST!

1 to 100	$1.15
100 or more	1.05
Tested queens	2.50

A. J. BOETTGER
Box 1432 OKEECHOBEE, FLA.

QUALITY QUEENS FOR '60
A strain that has gained world wide approval for almost half a century.
Price $1.00 each.
10% discount on lots of 100 up.
Begin shipping March 20th.
Shipments outside USA and Canada add 15%.

O. K. ANDERSON & SON
Box 193 Coffee Springs, Ala.



KELLEY'S BEES

Improved three-banded Italian bees and queens direct from our own farm. Shipments start April 1st, express or parcel post shipment. Thousands of extra queens.

	Queens	2-lb. w/q	3-lb. w/q
1-24	$1.25	$4.25	$5.25
25-99	1.20	4.00	5.00
100-up	1.15	3.75	4.75

THE WALTER T. KELLEY CO.

Clarkson, Ky.

Index to Display Advertisers

Aeppler Co., C. W. 121
Alvies, Dan W. 119
American Bee Journal 118
Anderson & Son, O. K. 127
Australasian Beekeeper 127
Australian Bee Journal 67
Baker's Apiaries 121
Bessonet Bee Company 125
Blue Bonnet Apiaries 119
Boettger, A. J. 127
British Bee Journal 70
Brunson, H. C. 123
Burleson & Son, T. W. 67
Calvert Apiaries 125
Canadian Bee Journal 121
Cary Corporation, M. R. 66
Chrysler & Son, W. A. 66
Coffey Apiaries, The 119
Conneaut Can Co. 70
Dadant & Sons, Inc. ..... Inside front cover
Daigrepont Apiaries 124
Garon Bee Co. 126
Harper, Carlus T. 121
Homan, Farris 125
Honey Sales Co. 68
Jackson Apiaries 117
Jensen's Apiaries 117
Jepson Co., H. H. 67
Jones & Son, Ltd., F. W. 67
Kanes Apiaries 124
Kelley Co., Walter T. 70, 128
Leverette Apiaries, Walter D. 118
Little's Apiaries 117
Lotz Co., August 68
McCary & Son Bee Co., G. D. 126
McVay, J. F. 119
Merrill Bee Co. 71
Miller's Honey Company 68
Mitchell's Apiaries 124
Myers Craft Mfg. Co. 67
New Zealand Beekeeper 123
Norman Bee Co. 124
Norman Bros. Apiaries 127
Norman, John A. 118
O'Ferrell & Sons, J. L. 117
Plant, W. E. 125
Prairie View Honey Co. 66
Reams, W. D. 127
Root Co., A. I. ..... Outside back cover
Rossman Apiaries 123
Shackelford, John S. 117
Smith, Delmar L. 127
Smith & Son, Geo. E. 118
Stoller Honey Farms 66
Stover Apiaries ..... Inside back cover
Strachan, Don J. 71
Taylor, Stewart 67
Walker-Lee Co. 125
Wally's Bee Enterprise, Inc. 70, 126
Wax Workers, Inc. 121
Weaver & Sons, Howard 71
White Pine Bee Farms 121
Wilbanks Apiaries 126
Williams Apiaries, Dr. 127
Williams Bros. Mfg. Co. 66
Wing, J. E. & Sons 122
Woodman Co., A. G. 67
York Bee Co. 72